

The Leading Magazine in Radio

RADIO NEWS

AND SHORT WAVE



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POPULAR PHOTOGRAPHY
RADIO NEWS



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EVERY STORY SCIENTIFICALLY ACCURATE



I jumped from \$18 a week to \$50
-- a Free Book started me toward this
GOOD PAY IN RADIO

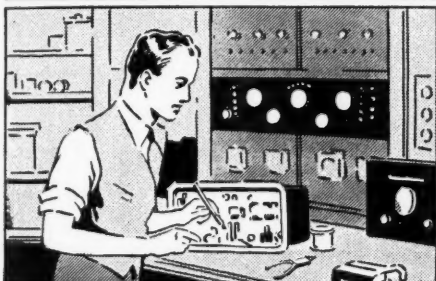
HERE'S
How it
Happened
 by S. J. E.
 (NAME AND ADDRESS
 SENT UPON REQUEST)



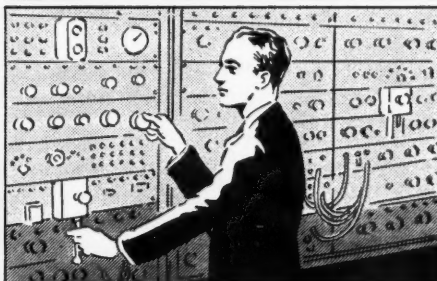
"I had an \$18 a week job in a shoe factory. I'd probably be at it today if I hadn't read about the opportunities in Radio and started training at home for them."



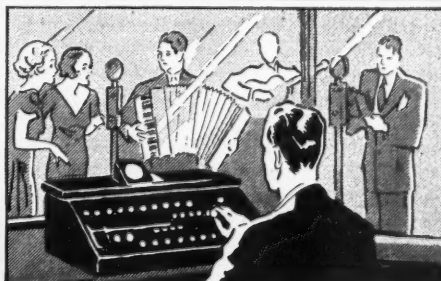
"The training National Radio Institute gave me was so practical I was soon ready to make \$5, \$10, \$15 a week in spare time servicing Radio sets."



"When I finished training I accepted a job as serviceman with a Radio store. In three weeks I was made service manager at more than twice what I earned in the shoe factory."



"Eight months later N. R. I. Employment Department sent me to Station KWCR as a Radio operator. Now I am Radio Engineer at Station WSUL. I am also connected with Television Station W9XK."



"N. R. I. Training took me out of a low-pay shoe factory job and put me into Radio at good pay. Radio is growing fast. The field is wide open to properly trained men."



Find out today how I Train You at Home
to BE A RADIO EXPERT

Many Make \$30,
\$50, \$75 a Week

Do you too want a better job? Do you too want to make more money? Radio offers many spare time and full time opportunities for good pay.

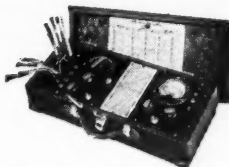
Get Ready Now For Jobs Like These

Broadcasting stations employ engineers, operators, station managers and pay up to \$5,000 a year. Spare time Radio set servicing pays many \$200 to \$500 a year—full time servicing jobs pay many \$30, \$50, \$75 a week. Many Radio Experts are operating full or part time Radio businesses. Radio manufacturers and jobbers employ testers, inspectors, foremen, engineers, servicemen, paying up to \$6,000 a year. Radio operators on ships get good pay, see the world. Automobile, police, aviation, commercial Radio, loud speaker systems, offer good opportunities now and for the future. Television promises good jobs soon. Men I trained have good jobs in these branches of Radio.

Many Make \$5, \$10, \$15 a Week Extra in Spare Time While Learning

The day you enroll I start sending you Extra Money Job Sheets. They show you how to do Radio repair jobs; how to cash in quickly. Throughout your training I send plans and ideas that made good spare time money—from \$200 to \$500 a year—for hundreds of fellows. I send special Radio equipment, give you practical Radio experience—show you how to conduct experiments, build circuits illustrating important Radio principles.

I Also Give You
 a Professional
 Servicing
 Instrument



Here is the instrument every Radio expert needs and wants—an All-Wave, All-Purpose, Set Servicing Instrument. It contains everything necessary to measure A.C. and D.C. voltages and current; to test tubes, resistance; adjust and align any set, old or new. It satisfies your needs for professional servicing, after you graduate—can help you make extra money servicing sets while training.

Find Out What Radio Offers You

Mail the coupon now for my Book, "Rich Rewards in Radio" and a sample lesson. They're free to any fellow over 16 years old. My book points out Radio's spare time and full time opportunities, also those coming in Television; tells about my Training in Radio and Television; shows you 131 letters from men I trained, shows what they are doing, earning; shows my Money Back Agreement. MAIL COUPON in an envelope, or paste on penny post card—NOW!

J. E. SMITH,
 President, Dept. 3ER,
 National Radio Institute,
 Washington, D. C.



J. E. SMITH, President, Dept. 3ER,
 National Radio Institute, Washington, D. C.

Dear Mr. Smith: Without obligation, send me free a Sample Lesson and your 64-page Book, "Rich Rewards in Radio," telling about spare time and full time Radio opportunities, and how I can train for them at home in spare time. (Please write plainly.)

Name Age

Address

City State 14x1



BARELY is the ink dry on the last issue than we find ourselves writing this column again for the May copy. Somehow, we wish that the April book had been on the streets a long time, so that from the reactions and letters which we expect to receive, we would be in a better position to give our readers that which they are looking for. But, this, like all other things, must await time. So for the second month we are again shooting in the dark in the hopes that we will please the greatest number of our readers.

IN last month's column we wrote inquiring about one Thomas D. Gooteé who had been reporting DX conditions in war-torn Spain and has dropped out of sight for over two years. Imagine our amazement when the mailman brought us a letter from Gooteé telling us that he was really very close at hand. Elsewhere in this issue the story of his experiences in Spain are duly published. We are happy that Gooteé got out of Spain when he did and that he is among the living. A mere cursory reading of his letter will convince even the most skeptical that the situation in Spain is really too horrible to relate fully.

THIS month we run an extensive article on short-wave propaganda throughout the World. We were surprised to receive a statement that General Electric stations W2XAD and W2XAF are inaugurating a short-wave broadcasting system which will blanket the entire South American continent. W2XAD is taking the eastern section and the other station, the western. Just what this portends cannot be guessed at, but it would seem that Uncle Sam has finally entered the propaganda war in earnest.

It will be interesting to see what developments, if any, come about with this sudden change of policy on the part of our Government. There are those who will say that the United States is not in the short-wave propaganda war merely because of the fact that two stations are actually beaming their signals on the South Americans. But let it be remembered that short-wave broadcast time cannot be purchased. The station license must emanate from Washington and cannot be procured unless "public necessity" can be shown. Just what "public necessity" would be shown by a South American beam other than that of propaganda, is hard to imagine.

Simultaneous with the announcement above, comes one that NBC short-wave service links the farthest corners of the earth. Peculiarly many writers who have been listening to NBC's short-wave sta-

tion write that short-wave radio is "drawing the nations closer together" and binding them "to work for peace." Someplace, somewhere, somebody is terribly wrong.

THE story of "Lum & Abner" is interesting. For many years these two comedians broadcast for a popular drink company. Eventually the president of the company died and left the estate to three people. It had been burdened with the usual taxes, and the three persons in charge had differences of opinion among themselves as to just exactly how the program should be run. As a result, Lum & Abner are now appearing for a different concern. It was a case of too much prosperity for the original Lum & Abner sponsors. After the death of the president the program brought in so much money that the estate taxes rose so high they were more than eating up the entire company.

WE learn, with some delight on our part, that the squeaky program of Mickey Mouse will soon be off the air. M. Mouse must be seen to be appreciated. Incidentally, and for the information of Walt Disney, Donald Duck must be a girl since "duck" is a female gender. If it were Donald Drake, that would more clearly express the sex of the character.

THE C I O has gone educational. From a Detroit station, in thirteen installments, a dramatization of Upton Sinclair's "Life of Henry Ford" is being presented in an attempt on the part of the United Automobile Workers to organize Ford men into the C I O. This is certainly a far-cry from the usual picketing tactics employed by unions. It has been reported to be more efficient, too.

THE POPULAR AVIATION-POPULAR PHOTOGRAPHY-RADIO NEWS family continues to grow, for this month AMAZING STORIES comes under the same management, featuring that "the fiction of today is the fact of tomorrow." This new publication will concern itself with scientific articles and fiction. It is a fitting member to join our family since the other three are concerned with the actual facts of today. The cover of AMAZING STORIES, posed by living models and done in full-color, is the first of its type to reach the streets. It has an entirely new staff, from the Editor to the Art Department. Lots of luck, gang, and welcome!

We are extremely happy to have AMAZING STORIES with us, because prior to its acquisition by the management we did not know what to do with some of the—shall

we say "unusual"—manuscripts which came to our desk. Now we simply send them in to AMAZING STORIES where there is some chance that "the fiction of today" might become "the fact of tomorrow."

UNION conditions in Chicago are such that in every "amateur hour" broadcast whenever an amateur plays any instrument of any sort, the broadcast studio must hire a union professional musician just to stand by and watch. The cost per amateur is around \$5. Unions must love them, no work, but full pay.

ABOUT a year ago, when Warner Brothers were having a copyright fight, both CBS and NBC were actually fined in excess of a million dollars each. However, when time for settlement came, not one cent was paid and everybody parted good friends.

During this same fight a coast-to-coast network featured a whistling parrot. When the parrot started to whistle "In a Little Spanish Town," Chicago was fined, while New York cut him off and supplanted him with a piano recital. All attempts to collect \$500 for breach of copyright from the parrot have failed. It all seems very hopeless.

HOW quickly memorable programs fade from the public ear. We wonder what has happened to the "Voice of Experience," "The Happiness Boys," "N. T. G.'s Bohemian Nights" and thousands of other programs which, in their day, were tops.

SOME idea of the magnitude of radio today can be obtained from an examination of the Eighteenth Annual Report of the Radio Corporation of America. Engaged in a business itself less than thirty years old, this corporation showed assets in excess of \$89,000,000. In connection with this statement, it will be interesting to read "We Were Broadcasting Thirty Years Ago" by Lescarbours in next month's issue. It sets forth the humble beginnings of this formidable industry.

IN the April issue we said that Tizzie Lish, famous on the "Watch the Fun Go By" Ford program, went by the real name of Bill Compton. This is an error. The gentleman's name is Comstock. To Tizzie Lish we tender our sincere apology so that "she" will not force us to eat one of "her" recipes.

USELESS Facts Department. Radio station KOOS is the most westerly
(Continued on page 62)

M A Y
1938

RADIO NEWS

AND SHORT WAVE RADIO

VOLUME 20

Number 11

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In the June issue will appear articles on the newly assigned ultra high frequencies and the transmitters used therein. Interesting to every amateur and engineer.

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A non-amateur, Producer Sterling Tracey pitches in to string a short wave antenna for a mobile unit.

FLOOD

**DEAD AND MISSING TOTAL 156
IN STORM; 10,000 HOMELESS**

Scoop

by JERRY GOLDBY

Radio News Correspondent reporting directly from the scene of the flood.

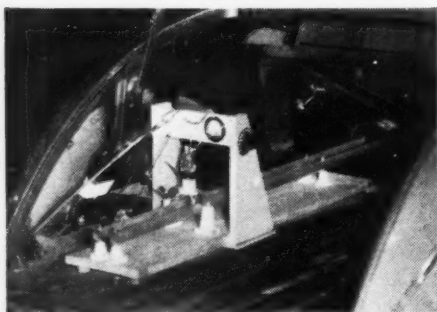
We held press for this scoop. Wires being down, our correspondent radio'd us the facts, and the pictures were flown here by devious routes. As complete a story as available of the amateurs' participation in the Los Angeles Flood.

WEDNESDAY morning March 2nd the world was informed of the terrible flood disaster that fell upon the city of Los Angeles and devastated an area of more than 1400 square miles. Immediately there sprang into action a series of organizations that had as their basic foundation ham radio operators. These organizations gave an example of co-operation and co-ordinated activities that has never been seen anywhere. There were the Red Cross Radiop net, the A.R.R.L., the California Forestry Medical Corps, the Sheriff's Major Disaster Communication Reserve, the Sheriff's Aero Volunteer Squadron, and others too numerous to mention. All worked in perfect harmony, and the stories of heroism circulated in this county about those fighting ham operators have raised a hitherto slightly known work and its organization to an unprecedented position.

For no other reason than helping out dur-

ing times of stress, these men risked their lives in keeping the channels of communications open. Wherever bridges were down, telegraph and telephone communications out, these ham operators in their mobile units took up watch and acted as the only means of communication for these areas. They remained on watch for as long as 72 hours and more, receiving and transmitting messages to Red Cross and Health Departments, and between separated families.

Now that the flooded areas have dug themselves partially out of the debris, many have wondered how these radio operators managed to drive their units into the inundated districts. But they did, and the force and conviction that gave these men strength to carry on against almost insurmountable weather conditions, can give the country pause for thought. How these organizations were formed and the manner in which they are made to co-operate, is a



The "long-lines" type 5 meter transmitter installed in an amateur's car. These sets did trojan service in "short haul" communications.

Part of the Sheriff's Major Disaster Communication Reserve to which Los Angeles owes its debt of gratitude for lives saved. Left to right: W6NBO (no name), W6WT, W6NTW, W6ASW, Lt. Ellison, W6EPU, W6NTY. The transmitter shown is the same as that to the left. (Inset) Matt Murray whose self-organized auxiliary net-work of hams supported the Sheriff's Emergency Staff in directing aid.



LIFE SAVERS

story that could make a very interesting and informative book. But we will gloss over the details.

It was during the earthquake disaster of 1933 that Lieut. C. W. Ellison, communication officer in charge of the Sheriff's department, thought of the idea that ham operators with mobile units might be interested in forming an auxiliary arm of the Sheriff's department. Although his own organization consists of only 50 cars with two-way communication systems they have an area of over 4,031 square miles in the County of Los Angeles which has to be covered.

Lieut. Ellison mulled this over for a long time before he came to the decision to make deputies of amateur operators and organize the auxiliary unit to be known as the Sheriff's Major Disaster Communication Reserve.

It consisted of an exclusive and hand-picked bunch of licensed amateur radio operators, up-standing men, above all able to pass rigid investigation by the Sheriff's office. These men were put through periodic tests to insure that they would be properly equipped to handle the situation when and if it ever arose.

When the present disaster broke upon Los Angeles this organization was directed from the main transmitter to go into districts where they were the only means of communication to the outside world. Telephone and telegraph communications had completely gone out of order. Wires were down everywhere, and if it weren't for these hams acting in the capacities of messenger boys and radio operators, the toll of 212 lives lost would probably have been much greater.

Standing in water over their running-boards, these mobile units remained in their



At the last outpost of the flood, the unfortunates received aid from the CBS men working hand-in-glove with the many amateurs who were often the only means of communications.

districts getting information for requests from headquarters and going to various places to ascertain the extent of damages.

Operating on a frequency of 56,000 kcs. they transmitted messages from the stricken areas to the main station, furnished the various divisions with the information they desired, as to medical needs, food requirements, and the bare necessities for warmth and life, and gave whatever aid they could to helpless women and children.

Running along the Los Angeles River

bank they kept the main station advised as to where bridges and roads were washed out, and in this manner were able to direct police cars and ambulances to their separate districts.

For years these men have waited to show their work when a disaster threatened this county, and when it did hit, the worst western flood disaster in over 61 years,

(Continued on page 80)

The amateur's car works into a flooded area. Equipped with emergency short wave transmitter, these hams risked their very lives to get doctors, food, and supplies to the stricken populace. (Right) A hastily constructed set operates from a car seat. These pictures were taken by our correspondent on the scene. He risked his life in the strong current.



Not For REBROADCAST

by "X-73-88"

The author is one of the best informed men on radio in the country, withholding his identity to maintain complete freedom of comment.

FOR years, we have reserved large grains of salt for rumors about "war rays," long-distance paralyzing bolts, etc. They make fine futuristic reading but present stages of electronic development do not presage an early discovery of such rays.

Now, Mrs. Widjetts is worried. She, I might explain, is the lady next door. The genial housewife who mails in boxtops or reasonably accurate facsimiles thereof.

Mrs. Widjetts came rushing in, with a clipping from her newspaper. As clear as day, the clipping stated that Mr. H. E. Taylor, vice-president of the National Inventors' Congress, says he saw—in actual operation—a radio ray that "stops engines of all cars within three miles."

Far be it from me to doubt the word of such an authority, but this column issues herewith the following offer:

I will risk my favorite toy electric train—and my own worthless carcass—within ten feet of Mr. Taylor's Fordkiller. If the ray itself causes the train (or me) to stop running, I personally will donate \$100 to any charity Mr. Taylor names—or to his press agent.

Mrs. Widjetts' curiosity must be appeased.

* * *

RADIO'S first "air pickets" are at work!

C.I.O. chiefs in Philadelphia, in the midst of an argument with a department store but afraid to picket it for fear of embarrassing members of other unions, have circularized slips reading: "Be loyal to the C.I.O. Tune out the store's radio station, WIP."

* * *

CROSS-COUNTRY:

New York: Shubert interests considering suit against CBS for alleged violations in airing "Maytime" bits. . . . Memphis: Jim Sanders read a poem over WREC. Church women thought it sacrilegious. Jim is in hot water with the clergy. . . . Chicago: Professors in NBC-Chicago U. weekly "Round Table" get \$50 per spiel. . . . Philadelphia: Boake Carter's new home "studios" boast a newspaper-type city desk across from which is, of all things, a big fireplace where a huge log burns.

* * *

BIG time airbills to leave the ether and the reason: "We the People,"—economy; "Double Everything,"—floppo; Dr. Roy Dafoe's Chats,—Quints aren't news; Tom Mix Adventures,—kids prefer G-men; "Melody Puzzles"—unpopular; Vick's MacDonald Show—flopporoo; the Packard Show—didn't get results; Gulf Oil summer substitute for Phil Baker—no pulling power; "The Shadow"—lost spon-

sor; Edwin C. Hill program—no go with the women . . . and so on and on. . . . Shifting networks: Edgar Guest's Interview from NBC to CBS. Is this the first of a long trek away from NBC? Will Fibber McGee follow?

* * *

COL. STOOPNAGLE and Budd are staging their annual bust-up. . . . Income tax collectors are making life SO unmusical for Bob Crosby! . . . The newspapers-radio feud might break out anew ere long. This time the press antagonism will arise from (a) radio coverage of special events and (b) cases where sponsors spend all advertising dollars on radio. There are several such companies.

* * *

HOLLYWOOD is proving too costly for many broadcasters, too otherwise unsound for others.

This coming summer will prove to the broadcast barons whether there's gold in them thar West Coast hills around Los Angeles. Until then, despite what they "reveal" to the press, the three major networks are holding up spending of good-sized dough out there.

One of the first to desert the Klieg Campus was hand-lotion ballyhooing "First Nighter." When Don Ameche's price and long wire charges became too high . . . and studio commitments too bothersome . . . the drama sponsor chucked Don, moved to Chicago, got a leading lady, started anew.

* * *

OTHER big-timers who are trekking Eastward include Paul Whiteman's ciggie series and 'tis said the next will be a comedy team known from coast to coast. All going to the lands of lower wire charges, less slovenly studio life.

* * *

HOW to say it. . . .

For the benefit of commentators and folk who read aloud, the following native pronunciations of Chinese places and people:

Lukouchiao is spoken as if spelled, "loo-ko-chow." . . . Tientsin is "tien ching." Wong Weng-Hao's name is spoken like "wong wung how" . . . and Gen. Chiang Kai-Shek himself speaks it thus: "jong ky sheck."

All syllables have equal emphasis.

* * *

(Answering H.K.T. . . . No, mother-in-law jokes are NOT barred from radio. You may get back at her in that way.)

* * *

PAGE George Washington Hill—

Perhaps I'm wrong, but I often wonder why sponsors continue to insist on the

fast-and-furious dance pace played by "Hit Parade" bands? . . . No one can dance to the tunes, I haven't found one person who doesn't violently dislike the style. Many say they won't even buy cigarettes plugged on the series—for that very reason.

Yet—year in and year out the series has stuck to the fast tempo once set by B. A. Rolfe, who inaugurated them.

Has anyone ever danced to the tunes? If so, speak up!

* * *

CONTRARY to rumors, the recent illness and absence from radio of Molly (of Fibber McGee and Molly Show) was brought on by a nervous breakdown, and was not due to their lack of success in movies last summer.

* * *

THE four Chicago network stations: WMAQ, WGN, WBBM, WENR recently combined efforts and stipulated that all local sustaining dance orchestra pick-ups would have to pay \$100 a week for the privilege of broadcasting. Network officials expressed the opinion that they had been giving out free time to the various hotels, night clubs and ball-rooms long enough. Immediately the Chicago hotel association decided against this ruling, and all hotels agreed not to pay for the broadcasts.

On January 15th all hotels went off the air, and will not be heard on any network until some agreement has been reached. Network officials contended it cost them at least \$100 a week to keep the various remote spots on the air—which is actually about twice what it costs. There were only three NBC spots aired regularly during March and April; only four on Columbia; and three over the Mutual System. The Chicago hotels continue adamant, and Chicago suffers due to the absence of its bands on the air. This fee must be paid by the hotel, night-club or ballroom owner—and cannot be paid by the orchestra leaders, due to Local Union regulations.

Due to lack of pickups in the field, several engineers at both Columbia and NBC will be laid off within a month. New entertainers were not hired by any network, contrary to announcements otherwise, and the late evening hours are now being filled by dance bands in other cities, the programs being piped in on the regular evening trunk lines. The situation is deadlocked since neither the networks or the hotel owners will give in.

* * *

COLUMBIA and NBC are anticipating labor troubles in the technical divisions of New York and Chicago.

* * *

SO what?

Groucho & Chico Marx are coming back on the air. . . . Kay Thompson married a slide horn player recently. . . . Andre Baruch is organizing a ping-pong association. . . . Toscanini is a swell poker and rummy player. . . . Lou Holtz is a realty holding co. . . . Walt Winchell is a DX hound. . . . Amos & Andy are known by those names to all their friends, but as Freeman & Charlie among themselves. . . . The FCC and a certain chain are "going to have it out" very soon—with the chain winning!

(Concluded on page 65)

HAM SLANG

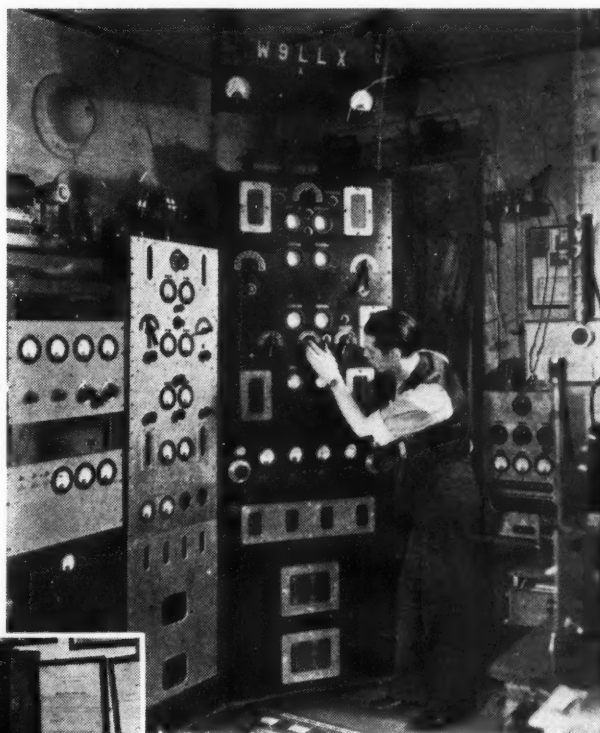
by CHARLES MAGEE ADAMS

Like the broadcasters, the licensed amateur radio fraternity has its own lingo. Pithy, caustic and for the most part accurate, ham slang will afford the short wave fan many hours pleasure if he can understand it.

"Q RX, old man, QRX. Something smells hot around this rig." Pause, broken by thumps and clatters. "O.K., old man. It's the power supply to the final. And is she hot! I'd better QRT before something blows. Hi. Anyway, the skip and the QRM must be bad by now. Besides, the OW says it's time to eat. So thanks a lot for a most enjoyable QSO, old man. I'll be looking for your QSL. I gave you my QRA, and the handle here is Bill.

Harry (W9LLX) Harrison adjusts his rig, by tuning the tank and watching the soup. A kilowatt of ham transmitter on 160-80 meters.

The receiving position. W9LLX QSO's while QRX waiting to QSY.



So 73, SK and lots of DX, old man. W9XXXX in good old Chicago is signing off and clear with W1ZZZZ in Boston, the home of the bean and the cod. See you again, old man; diddle-de-bump-de-bump."

Doubtless you've heard something like that many times while dialing the amateur phone bands. It's neither the King's English nor plain-folks American. Instead, it's a language within a language, a cryptic tongue that might well be called "hamese."

You'll hear it spoken only on the amateur phone bands or at "ham" fests. For "hamese" is the language peculiar to the amateur radio operator or "ham." Even the word "ham" is part of the lingo.

Because most of it means about as much as Sankrit or Hindustani to the layman, you may have suspected that "hamese" was devised to discourage short-wave listeners (SWLs in "ham" language) from eavesdropping on amateur phone conversations.

But that isn't the explanation.

As a matter of fact, there is no single pat explanation of "hamese." It "just grewed" for various reasons and from various sources.

What makes it important—and maddening—to short-wave listeners is that it keeps them from getting the most enjoyment out of the amateur phone bands. On a good modern receiver they can hear "hams" from near and far. But a lot of what they hear may as well be Greek. So it seems high time to lay bare the mysteries of "hamese" for the benefit of the many SWLs who would do more prowling on the amateur phones if they could translate what was being said.

Learning the "ham" language isn't really difficult. For it follows a fairly simple pattern. Instead of being a hodge-podge without rhyme or reason, it's built from three main sources: telegraph symbols

technical slang and Q abbreviations.

The reason telegraph symbols have been carried over to phone is natural enough. Every amateur must know the code in order to get a license. More than that, many of the telegraph symbols are convenient tools that can't be duplicated in ordinary speech.

An example is the ubiquitous CQ. Some impious soul has dubbed it the mating cry of the amateur. When you hear a "ham" saying "Calling CQ, CQ, CQ, calling CQ to any seventy-five meter phone," what he means is this: "I want to talk to somebody. I don't give a darn who. Does anybody hear me? If you do, speak up. I've got things to get off the old chest."

A mere "hello" wouldn't say all that. CQ saves time and trouble by reducing an involved request to two letters. Telegraphers hit upon CQ for just that reason, and phone operators have found it admirably suited to their needs.

While a plain CQ means "I want to talk to anybody," there are variations with other meanings. You've probably heard an amateur "calling CQ, Los Angeles." He is saying, "I want to talk to somebody in Los Angeles. To heck with the rest of you guys." Again you may have heard a "CQ DX." This means "I'm trying to get somebody a long way from here. I'll chew the fat with you home town boys some other time."

For DX is the telegraphic abbreviation for distance. Literally it means the number of miles between transmitting and receiving points, whether few or many. But, by usage, it's come to mean great distance.

When a "ham" gets an answer to his CQ the conversation that follows is certain to be well sprinkled with other telegraphic symbols. If he's in a jocular mood he'll probably throw in a "hi" every now and then. This is merely the code sign for

(Continued on page 81)

"STUDIO BRIEFS"

by SAMUEL KAUFMAN



Impersonator of Presidents, Charles Webster has "done" Abraham Lincoln over 300 times.

NBC deserves a round of applause for signing up Caesar Searchinger as director of the important new series entitled "The News Behind the Headlines."

Searchinger is introduced by the network as a "noted correspondent, editor and radio commentator." However, the job that won him his greatest fame in broadcasting was his post as European director of the Columbia Broadcasting System which he ably filled for so many years.

NEVER before in the history of American radio did a single personality get the attention and effort allotted to Toscanini by NBC. Actually, instead of making his talents and work conform to the standards demanded by the microphone, the network remade radio to suit Toscanini.

Aside from expenditures for musicians, equipment and other items made all the more costly by the high Toscanini standards, the chain, knowing of the Great Toscanini Temper, attempted to iron out spots that were already smooth but where wrinkles may have otherwise appeared.

Here are a few of the departures from ordinary studio routine taken for the Toscanini programs:

The programs were printed on rustleproof materials to prevent crackling sounds that might tend to annoy the conductor. Silk, leatherette and even blotting paper were used for programs. These not only proved rustleproof, but made interesting souvenirs for the lucky 1,500 admitted to each broadcast.

No announcements were heard in the studio proper. All program notes were read from another studio while the visible audience stood and stretched while waiting the conductor's return to the podium.

Time, an all-important item in radio, was given a secondary rating to the great Toscanini. If the program had to run overtime, okay. And to prevent anyone from becoming restless during a symphony not to his taste, the studio clock was covered. Even time stood still for Toscanini!

STATIONS in various parts of the United States have often exercised ed-

itorial powers over program material. But it is rare for a broadcaster to make definite editorial expressions on his own behalf. Rather, all views heard over the air are those of the speaker and not the station. But along comes WMCA, New York, with a sign-off prayer that is used every night. According to Donald Flamm, president of the station, the prayer is for "oppressed people in other lands."

The prayer, preceded by the national anthem and provided with a musical setting, follows: "At this time, may we express the fervent prayer that the sweet freedom of democracy, so keenly enjoyed by all Americans, may some day soon, be restored to those peoples of other lands who, tonight, are yoked by oppression. And may the spirit of brotherly love preserve inviolate the glorious principles on which our own great country was founded. Peace on earth, good will to men."

DAVE ELMAN, star and producer of the CBS "Hobby Lobby" broadcast,



Caesar Searchinger, CBS European director - commentator.

has turned a freak idea into a hit radio series. His Wednesday programs don't feature such ordinary hobbyists as stamp-collectors, amateur astronomers, gardeners, etc., but rather persons with such unusual pastimes as teaching walking fish how to walk; playing xylophone solos on animal bones and collecting the world's worst jokes.

THEY are brothers under the din! We're speaking, of course, of the several brothers who are featured on the air. In most instances, the success of brothers is made individually rather than by teams.

Latest listing under the radio brothers classification is young Jim Ameche, kid brother of the more famous Don. Oddly, Jim, only twenty-two, played leads in Campana's "Grand Hotel" on NBC, the series that gave Don his start to fame. That started only last November. Within two months, he was given a second stellar role in "Attorney-at-Law," on the same network. He not only resembles Don in



Under the aegis of Dave Elman, a freak idea became the now popular CBS feature, "Hobby Lobby."

mike talents, but bears a striking facial likeness to him. In the meanwhile Don is continuing to gain in popularity both as



Toscanini the great, a soft spoken, quiet gentleman, for whom NBC made time itself stand still.

master-of-ceremonies of the NBC Chase & Sanborn Hour and as a screen star.

IN radio acting, like everything else, it pays to specialize. This is demonstrated by the odd career of Charles Webster, New York radio actor frequently heard on NBC and CBS programs as a portrayeur of Presidents of the United States.

Although he has impersonated many of the nation's chief executives, his most successful role has been that of Abraham Lincoln. Since his radio debut in 1927, Webster portrayed the Great Emancipator more than 300 times, the greatest rush coming around the anniversary of his birth.

NBC Briefs

W. O. CONRAD, studio engineer and operator of station W9WC at Elmhurst, Ill., who was relieved from active duty during the Ohio Valley flood of 1937, has been notified by the American Radio Relay League that he has been named as the recipient of one of the League's annual Public Service Award certificates for his work during the flood.

Uncle Ezra (Pat Barrett) got a letter from an Englishman the other day asking him what he meant by his frequent references to watching his "P's and Q's." The query stumped Pat, so he did a little research and came up with the following explanation. In the old days, as tavern keepers kept track of what customers owed, they marked purchases down on a slate hung on the wall—P's for pints and Q's for quarts. (How about it, Mr. Ripley?)

Charlie Arnold, brother of the famous movie actor, Edward Arnold, and now a member of the cast of the dramatic serial, Attorney-at-Law, was hit by a falling tree during the filming of "Come and Get It" and was laid up for several weeks with cracked ribs. He was serving as his famous brother's stand-in at the time.

Hamming is their hobby—Jules Herbuevaux, Central Division assistant production manager, has a transmitter in his Wilmette, Ill., home. Gale Swift, who operates station W9IVD in Chicago is a member of Chicago's music department.

(Continued on page 74)

NOT even remotely would we consider offending the artistic temperaments of certain of the so-called radio coaches. To call them out and out racketeers and print their names would be just cause for a vindictive libel suit. They manage cautiously to pussyfoot on the nebulous line that borders the legal definition of a racket. Ethically, however, they are unquestionably beyond the pale.

Open your Sunday paper to the "Musical and Dramatic" section of the Classified Ads. You will see there an imposing assortment of inspiring advertisements, like those heading this article, which are strangely reminiscent of the "Be a Radio Star" inducements, once

works. But if you're hopeless, he won't hesitate to tell you."

Of course you're radio material, you say to yourself. Then you wait avidly for her next words.

"That's why we insist upon auditioning you before we let you enroll for lessons. Mr. Bailey wants to be sure first that both he and you aren't wasting time."

It sounds very fair so far. But suspicion begins to smoulder in your eyes. What was this audition going to cost?

The latest gold brick razzle-dazzle. Preying on the unsuspecting would-be artists and announcers in the newest mulcting schemes, of—

Your worries are soon dismissed. You don't get to see Mr. Bailey, but his secretary, all smiles, informs you that you have been admitted. Outside of a disconcerting "breathiness" of voice, you have splendid dramatic qualities. And if you practice patiently, with the proper instruction, your difficulties will be ironed out. When would you like to take your first lesson?

And so you "are taken" for an introductory course of six lessons. You fuss with your diction. You learn not to stand too closely to the mike and blare into it. You are corrected when you interpret a line badly. You are importantly impressed by your new associa-

BE A SUCCESS ON RADIO! WE CAN PUT YOU IN RADIO DRAMA! EARN \$2000 PAID A WEEK TO RADIO ARTISTS! EARN \$50 A WEEK SINGING ON THE AIR! SEE JACK

Radio Rackets

TAUGHT BY A MIKE! GET INFO CAN YOU? CAN YOU SING? BIG RADIO

BY "SPECIAL INVESTIGATOR 13"

so common. Only these suggest artfully that you too can be the life of the ether, whereupon they proceed to anesthetize your sales resistance.

If you happen to be one of those unfortunate individuals who has suffocated your dramatic or singing aspirations for years and years, woe unto you when you chance upon such an ad! A new light has come into your life. Here is your opportunity to discover whether your talent is actually commercial. Feverishly you reach for the telephone to make an appointment. "So sorry," says the secretary of Putridaire Productions, "but Mr. F. X. Bailey is rehearsing at QCX today. Can you make it tomorrow at one?"

At last tomorrow comes. You don your dignity and traipse up to the studio. The secretary takes you into a little room and explains all about it.

"Of course you know," she begins, "Mr. Bailey is quite well known as an — and — artist," mentioning two networks. She neglects to tell you that the network has protested the use of its name in advertisements, because Mr. Bailey has never been employed on its staff as a sustaining artist, although he has acted on a number of commercial shows. She continues, "For years he's coached hundreds of students. If you're radio material, you can count on it, Mr. Bailey will polish you up, correct your errors in enunciation and expression, and make you ready for an audition at the net-

"Unlike the other schools, we don't ask a penny for the audition." She beams at you.

"If he does accept me," you quaver fearfully, "what are the fees?"

"Only \$3 a lesson."

That was reasonable. You've heard of coaches generally charging \$15 a lesson!

Then the secretary caps the climax. "And as soon as you're good enough, we'll put you on one of our radio programs."

"What program?" you ask excitedly.

"One of our programs," she evades.

"You mean," you persist to her great annoyance, "you'll actually get me a job?"

"Oh, no!" She shakes her head sadly. "We don't promise anything like that. We can't. All we can do is prepare you so that you'll be qualified to get yourself a job." No wonder the secretary is sad. She knows if she promises a job and doesn't deliver, she may be liable for running a racket. But you don't know that.

You're ready to take your audition. You enter a large studio with a prepossessing microphone. The floors are carpeted. The walls are sound-proofed. Opposite you is a great glass window, separating you from the coach, who flashes a dental smile at you, presses a lever on a little box before him, and speaks to you through the amplifier. You are given a little booklet and asked to read the lines to the best of your ability. The forbidding glowers and grimaces of the coach make you fear that maybe, after all, you had no business leaving your own fireside.

tion with this strange and glamorous world of radio. Then your turn comes to do a bit on one of Mr. Bailey's broadcasts. You find you're broadcasting on one of those "down-at-the-bottom-of-the-dial" stations, between two others broadcasting in foreign languages to which few listen.

Disappointment turns to rancor when your ears happen upon the information that Mr. Bailey buys the time on these stations himself. He sends salesmen around the city to get the Golden Pop Corn Machine people or the Big Apple Inn to buy spot announcements on his program. The issue that disgruntles you is that he's using you without remuneration to help fill in time between commercial announcements. Moreover, your services however poor they may be, are what enables Bailey to sell the time. *So you pay to be on a program the sponsor pays Bailey to produce.*

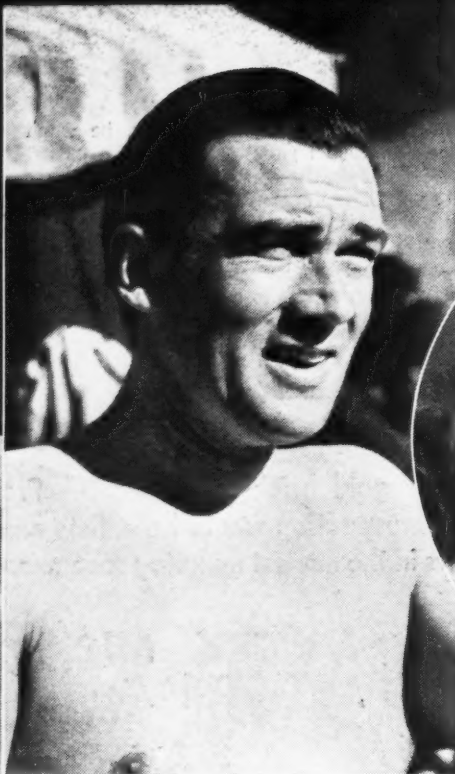
You can't help learn what people think of the program. It is not as good as the average big time "amateur hour." However, there was no misrepresentation. You did appear on an actual broadcast. You were given professional advice by an artist. And, most ironically of all, you might go away and be a thundering success—if you happen to be the lucky No. 1000 and not one of the other 999.

Extremely deplorable is the fact that most of the innocents who attend radio schools are too inexperienced to sift the dirt from the gold. The newness of their

(Continued on page 76)



Ernest Truex is always nervous. . . .



Walter Pidgeon is an inveterate apple eater. .



Gladys George plays with her hair. . . .

Microphone

by CHARLOTTE BUCHWALD
"The Playgoer," WMCA.

There are few radio stars who do not exhibit some unusual habits before the microphone. The author tells entertainingly of some of the stars' odd mannerisms while being interviewed by her.

ABOUT three or four years ago I started to interview radio and theatrical celebrities on the air, . . . soon discovered that stage and screen actors do strange things if confronted with a microphone. Some people are nervous, others determinedly calm, but each one of them does something a little bit different from his brother actor.

I remember my very first guest star was Cecelia Loftus, an old time actress and a trouser. It never occurred to me that it would be a trial for her to answer into a microphone the questions I fired at her. When she entered the studio she looked at the microphone and shuddered. I handed the carefully written manuscript to her. We read it together for timing. We were ready to go on the air.

The production man gave us a two minute signal to stand by. Miss Loftus fell into a chair. Her script rattled loudly. She declared audibly she couldn't possibly talk over the radio

then or ever. One minute and a half to go. She was adamant in her decision. One minute and she hadn't changed her mind . . . Ten seconds . . . The trio played the theme song while the announcer told the radio audience the "Playgoer" was going to interview that celebrated star of stage and screen—Miss Cecelia Loftus.

I seriously doubted it at that minute. However, I asked Miss Loftus a question. A second or two passed. She answered. I looked around and saw the announcer removing her hat. She had motioned for him to do so. He was propping "Cissie" up before the mike with one hand on her back. With the other hand he helped steady her papers. Somehow we got through with the program. I don't know how.

There was a dull thud as we were being signed off the air. Miss Loftus was sitting motionless. A page boy was holding water to her lips. I started to fan her. When she had completely recovered from her ordeal I told her

I was sorry because I had dragged her through such a harrowing experience as an air interview. Her blue eyes shone from under her lovely white hair. She said, "You know, I've enjoyed this. I'd rather like to do radio work." That last statement gave me the courage to continue with my program.

Since then I have found that actors give vent to their nerves in various ways when they're on the air. The late Frank Vosper was a knuckle cracker. Charles Walter is a prize jilter. Sam Byrd is an ear puller.

Also I learned that not all the strain is while you're on the air. Take the case of Russel Crouse, a playwright acclaimed for his successful musical comedies.

Together, Russel and I, had written the script. The day of the program arrived. I called his office to remind him of our air date. Joe Heidt, his assistant answered the phone. Russel had left for Philadelphia and wouldn't be back in town for several days . . . I was so surprised I couldn't speak, but I did let out a loud shriek!

"Buck told me to call you but I forgot. It's all right, isn't it?" Joe asked innocently. "You can get somebody else. Your program isn't until one-thirty and it's only eleven-fifteen now."

I sputtered for words and hung up. I frantically telephoned every actor I



Ruth Weston, former sub-deb, of radio and screen fame, tears her handkerchief. . . .



Evelyn Laye (center) caught by the candid cameraman among a group of friends who are important theatregoers. When the author inadvertently insulted her husband during a moment's confusion on a radio program, Miss Laye stopped speaking to her.

Manners

knew. No one was at home. I sank back with my head in my hands and decided radio was the bunk and all theatrical people were unreliable. My telephone rang. The only reason I answered was that the incessant jangle of the bell was giving me a headache.

"Hello, Charlotte," said a voice. "This is Russel."

"Russel, you so and so," I shouted. "What do you mean by going to Philadelphia when you're supposed to be my guest star?"

He just laughed. Between chuckles I gathered he was seated at his desk. I was bearing the brunt of his sense of humor. Mr. Crouse arrived just in time to go on the air, so I couldn't bawl him out then. He rattled his papers loudly throughout the broadcast and then having completed his part of the program he sneaked out of the door while I was making a few kind remarks about him. I've been meaning to get even with him ever since. But he's such a nice guy!

It was he who introduced me to Jane Cowl, and arranged to have me interview her. Miss Cowl and I met two or three times and we got along beautifully. I looked for no difficulty at the studio, and invited a young friend to the radio station to witness the broadcast. She was quite excited. She had never before visited a radio station nor

had she seen this noted actress at such close range.

Miss Cowl arrived and we went over the script three or four times. A few minutes before air-time Miss Cowl discovered my friend and demanded, "What is she doing here?" I explained she was visiting. "She can't stay here," said Miss Cowl lighting another cigarette. (Smoking is prohibited in the studios.) I tried to point out that it would be impolite to ask my guest to leave. Miss Cowl looked around the studio and sighted an organ bench. "Sit over there where I can't see you," she said to the girl. "It makes me nervous to have anyone watch me broadcast." She put the fourth slice of chewing gum into her mouth just as the red light on the studio wall flashed indicating we were on the air. Josephine Dillon Gable, Clark's first wife, is a gum chewer, too. Now, I hide visitors under the piano. [*Miss Cowl is known as "Spearmint" to intimates because of her gum chewing.—Ed.*]

Jane Cowl, however, was not the only guest star who objected to having a studio audience. As time went on, people wrote in asking for tickets. They wanted to see as well as hear these broadcasts. We mailed out sixty or seventy tickets each week. As soon as the rehearsal was over the audience was invited to enter the studio and

find seats for the rest of the program.

On one occasion, Henry Daniell, who had come over from England to be Grace George's leading man, looked up from cleaning his eye-glasses and saw a group of people filing into the studio.

Mr. Daniell carefully adjusted his pince-nez on the bridge of his nose. "Who are all these people?" he wanted to know.

"Studio audience," I replied brightly.

"You mean they're going to watch the broadcast?" he insisted, frowning.

"Yes. At their request we have sent them tickets for this afternoon," I said.

"Oh, I couldn't read lines with anyone watching me."

He picked his hat and brief case off the table and started for the door. I implored him to stay. "When these people leave," he stated flatly, "I shall be glad to go ahead with the program; otherwise I'm afraid I can't remain."

I think that was the first time in radio history an audience was dis-invited and sent out to clutter up the waiting room.

By the way, Mr. Daniell is an eye-glass fiddler just as Carol Stone is a bracelet rattler. Walter Abel turned out to be a hair pusher-downer and Violet Heming is a late arriver.

It's always upsetting for the interviewer to wait for the interviewee. Frequently the guest star is late, which

(Continued on page 66)

The Menace of SHORT

Mussolini twists the English Lion's tail by broadcasting into the Near East.

"Boring from within" is now the accepted preliminary to modern warfare. It is a potent and insidious force that paves the way for armed invasion.

"More than all the peace conferences of history radio has served to make the concept of 'Peace on Earth, Good Will Toward Men' a reality, and, taking the world by the hand, has led it one big step farther down that trail that ends in Utopia."—Maj.-Gen. James J. Harbord, chairman of the board, Radio Corporation of America, in an address ten years ago.

TODAY the nations of the world are engaged on a gigantic new battlefield with waves and words as weapons; the domination of millions the objective. The tactics are all alike—to broadcast their own dogma and to malign their enemies in as many tongues possible.

While the dictator-ridden countries have led the attacks in this war of the waves, Great Britain lately has been forced to join. America has kept out of the martial fray so far but is making it a sort of war of Swords and Roses by launching a new diplomacy of peace through short-wave broadcasts to our neighbors.

Preoccupied with the menace of bombing planes and anti-aircraft defense, the world military strategists had almost overlooked the guns of radio. Conceivably wars of the future may be won through these cannons of the kilocycles. They fire no bullets. Their ammunition is propaganda. Their bombardments from lofty broadcasting towers stop at no frontiers. Penetrating into the deepest of bombproof shelters, they also filter into the most peaceful of homes. They are mighty weap-

ons in the gigantic struggles to subjugate peoples and races, to bring them under the yoke of dictators.

While the war by radio propaganda is the fiercest over Europe, the western world has not been overlooked. Each day more than 40 so-called "newscasts" are aimed through directional antennae at the United States. All are in English, deftly garnished with fine music and stirring drama. But their purpose is to sow seeds of discontent and malice.

To democracies, the most dangerous transmissions come from Germany, Italy and Russia with the Spanish factions and Tokyo not so far behind. Germany's campaign has been most effective. Her drenching of Austria with Nazi "kultur" and sedition undoubtedly fired the Dollfuss murder coupe and provided the opening wedge for the recent entry of Hitler's minions. The constant and unrelenting blasts of propaganda forced Schuschnigg to Bergtessgaden to yield to Der Fuehrer's promises—or threats.

Mussolini's attacks against the British in the near east—his honeyed protestations that he was the real champion of Islamism had a telling effect in Palestine—and even India. This was the gadfly that stung Great Britain into the conflict.

Thus a few months ago she launched a new million-dollar superstation at Davenport to enter the international propaganda babel of Russia shouting in 57, Italy in 18, Germany in 6, England in 5 languages.

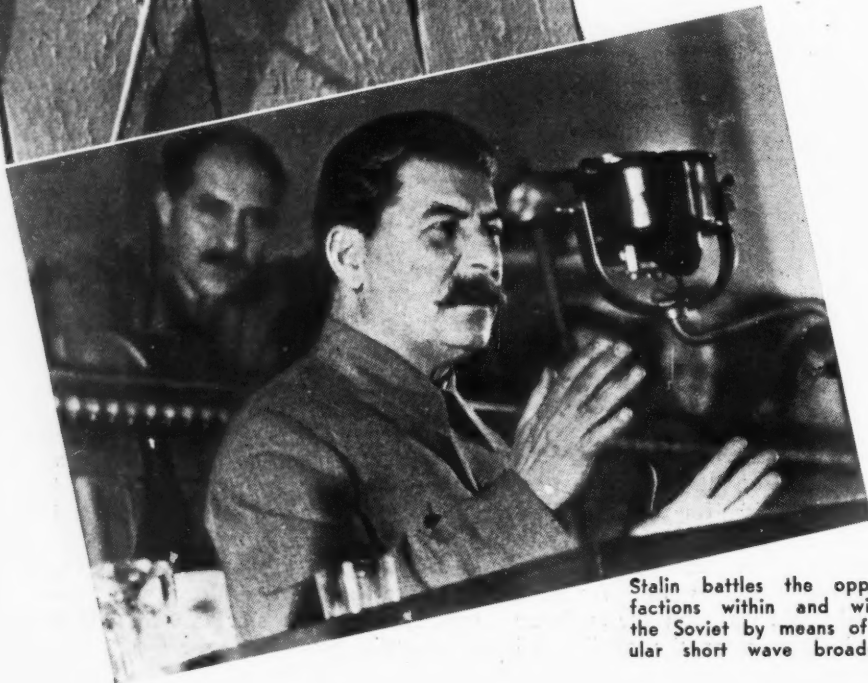
Every day since January 1, Great Britain, using the new radio artillery, has been spraying the near east with soft soap and pap. But the counterblast to Il Duce's voice has fallen flat. The Bedouins, it seems, prefer Mussolini's seductive Arab singers from Bari. They say Mussolini's Arabic is more genuine, too.

Britain's insistence that Arab countries are flourishing under Empire mandate are not too convincing.

"If Great Britain wishes to serve the Arabs," they say, "let her serve them by settling the problem in Palestine."

The Italo-British war-by-air in the near east contributed materially to the recent crisis which cost Foreign Minister Eden his official neck. When it was all over the British Lion was eating out of Mussolini's hand. The war by air came near shivering the timbers of the Empire.

Let's take a closer look at this international combat-by-kilocycles. Germany's system is probably the most efficacious. Focal point for the Hitler system is at Zeesien, 20 miles south of Berlin where a dozen lofty towers hurl stentorian voices



Stalin battles the opposing factions within and without the Soviet by means of regular short wave broadcasts.

WAVE PROPAGANDA

by LARRY WOLTERS

at the three Americas, Africa, and eastern Asia and Australasia.

Germany's world-wide propaganda efforts would have been impossible prior to the development of shortwave transmission. Long wave stations—on the broadcasting band—roughly speaking, have an effective range of 500 miles.

Short waves, through the skip effect, reach peoples half way round the world, and also deceive the folks at home.

These waves are bounced up into the stratosphere against the Kennelly-Heaviside layer of ionized gases, and then are accurately deflected on the countries aimed at. Thus they bounce across the ocean from Berlin to New York and westward, reaching the audience for whom they are intended. Oddly enough, these same impulses, carried thousands of miles away, can be heard at the point of origin for only about a radius of five miles. Thus nature has aided the dictators in dispatching rosy lies about home conditions and spreading fear and hatred without their subjects knowing or hearing.

Even television, still in the testing laboratory in America, already has been commandeered by Hitler. Germany's war department long since has taken over visual-radio.

"That was done," an American radio manufacturer observed recently. "so that the German people could be made to look at as well as listen to Hitler, Goering and Goebbels without being able to take a shot at them."

Listen they most definitely do. Fears of persecution by the secret police get Hitler an audience of three-fourths of the total population when he steps to a microphone. A closer look at the German system reveals why it is so effective.

Hitler realized the might of this weapon as soon as he seized the government. He proceeded to organize it so that it might serve him to the utmost. He ordered all manufacturers to build a standard three-tube "peoples" receiver—cheap enough so that all could afford it, yet not powerful enough to reach beyond nearby stations. That was to prevent eavesdropping on foreign broadcasts—particularly those from Russia. Many a Nazi burgher has encountered trouble with the secret police for listening to the dulcet waftings from Moscow.

Having organized broadcasting at home Hitler turned his attention to a short wave system to sell Naziism abroad. He did a sound job of it.

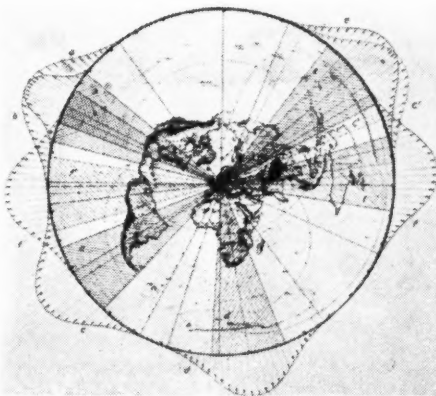
The war of the waves may seem a dis-

(Continued on page 67)



Not satisfied with impressing his doctrines within his own frontiers, the modern dictator sees that his propaganda is carried world-wide.

A radio coverage map clipped from a German source shows how the famed station at Berlin is designed to reach every civilized nation. ↓



With war clouds gathering, the propaganda radio operators are fully equipped to carry on the important work under all emergencies. ↓



Persuasive, yet forceful, the dictator pitches his speeches so that the listeners in foreign countries are completely taken in. Truth is the least of his worries in his short-wave conquest.



May Singhi Breen and Peter de Rose, the original "Sweethearts of the Air." Mrs. de Rose sings and plays the ukulele, while hubby is a songwriter and pianist.

MR. & MRS. of RADIO



Harriet Hilliard Nelson and her famous band-leader husband Ozzy. Homeloving ←folks, they have one child.



Jane and Goodman Ace. Few husbands have the opportunity of "insulting" their wives over the air and getting paid for it.

THE equality of the sexes being what it is, the legal rights of a husband are limited in this country these days. No longer can he chastise his wife, as under the common law, although he is still, quaintly enough, recognized as the legal head of the house. His duty, says the law, is to support the family and the wife's duty is to render household services.

In the case of radio entertainers a special dispensation seems to have been handed down to void the regulations as to their respective obligations. For the broadcasting studios are thickly populated with wives so busy helping hubbies support the family they haven't much time for household duties. And the husbands, being jointly occupied with their mates in commerce, naturally can't attend to the housework even if the laws of nature and man so decreed, which they don't.

It really is surprising how many couples are riding the kilocycles in tandem. Orchestra leaders and their singing spouses are numerous among them; several husbands and wives who are actors appear together; and there are many other combinations such as instrumentalists etcetera. But it is the comedians and their consorts who rule the roost in radio.

Here is how they line up on the national networks: Jack Benny and Mary Livingstone, Fred Allen and Portland Hoffa, George Burns and Gracie Allen, the Easy Aces (Goodman and Jane Ace), Fibber McGee and Molly (Jim and Marian Jordan), Tim Ryan and Irene Noble, George Jessel and Norma Talmadge, and Uncle Ezra and Cecilia (Pat Barrett and Nora Cunneen).

Of course, this doesn't exhaust the list of comedy headliners who are married. There still remain such figures as Bob Burns, Charles Butterworth, Phil Baker, Eddie Cantor, Al Jolson and Walter O'Keefe who managed to carry on unaided



Gracie Allen and George Burns. Their feelings towards each other are not what they seem in the picture.



Although not often on the air together, Ruby Keeler Jolson and her husband, Al, are a well known radio team.



and unabated by their matrimonial mates. But one never knows when the little woman will bob up on the same program with them. Indeed, Jolson overlooks no opportunity to produce Frau Ruby Keeler as a guest star and Cantor refers so constantly to his Ida that to all intents and purposes she is part of his act.

In other branches of entertainment—the stage, the screen, the opera and the concert
(Continued on page 72)



Irene Noble and Tim Ryan found that radio was an outlet for both their abilities.



Portland (Tallyho) Hoffa and Fred Allen who hide themselves away while Fred writes his own material with her help.



May Singhi Breen and Peter de Rose, the original "Sweethearts of the Air." Mrs. de Rose sings and plays the ukulele, while hubby is a songwriter and pianist.

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Gracie Allen and George Burns. Their feelings towards each other are not what they seem in the picture.



Although not often on the air together, Ruby Keeler Jolson and her husband, Al, are a well known radio team.



and unabated by their matrimonial mates. But one never knows when the little woman will bob up on the same program with them. Indeed, Jolson overlooks no opportunity to produce Frau Ruby Keeler as a guest star and Cantor refers so constantly to his Ida that to all intents and purposes she is part of his act.

In other branches of entertainment—the stage, the screen, the opera and the concert
(Continued on page 72)



Irene Noble and Tim Ryan found that radio was an outlet for both their abilities.



Portland (Tallyho) Hoffa and Fred Allen who hide themselves away while Fred writes his own material with her help.

DOROTHY THOMPSON—LADY ASTOR OF THE U. S. A.

MIXING objective analysis, mimicry, sarcasm and debate in her lectures, Dorothy Thompson has won attention as one of the country's clearest thinkers on important events of the day. Many have called her the Lady Astor of America, a title which her democratic soul decries. Others insist that if a woman is elected to the White House within the next 30 years it will be Dorothy Thompson, the woman who is believed to have inspired Sinclair Lewis' novel, "It Can Happen Here"; who wrote "The New Russia"; who sued Theodore Dreiser; who tussled with Adolf Hitler, and who bearded Mussolini and Stalin in their dens.

"I want to tell you *what kind of guys they are*," she says of the world figures she attempts to describe in her "People in the News," broadcasts over NBC.

Well, what kind of woman is Dorothy Thompson?

That ought to be a fair question; she herself is a worthy subject for one of her own broadcasts. Internationally known since she was ordered out of Germany by Hitler, Miss Thompson is the kind of woman who hates dictators. Once married to and later divorced by a Hungarian, she is the kind of woman who so appealed to Sinclair Lewis, Nobel Prize-winning novelist, that he proposed to her on the same day he met her and then followed her half way across Europe to Russia to get his answer.

Precedents mean nothing to "Thompson," as she is called by newshawks. She once covered a Polish revolution in evening dress and satin slippers and she is the only woman who has defied convention to address the Harvard Club in New York City.

Coincidence has played a large part in her life. She arrived in Ireland the week Archbishop Mannix was kidnapped; in Milan, the day a great steel strike began; in Vienna, the morning of the first Karlist putsch.

Considered by many future possibility for the first woman president is Dorothy Thompson.



Though Miss Thompson is a popular hostess and a sought-after guest whose conversation raises a dinner party to salon proportions, she is the kind of woman whose energy makes it impossible for her to be content with being the wife of a great novelist, the mother of a 7 year-old boy, the manager of a Vermont farm, a Bronxville, N. Y., home and a New York apartment. Instead, she writes a newspaper column, conducts a radio broadcast and speaks all over the United States as one of the top ten lecturers most in demand in the country.

In short, Miss Thompson is not only a celebrated journalist, political analyst and radio commentator, but she is also a woman of depth, charm and brains. One of the most fascinating and brilliant personalities in public life today, she shuns the severe, tailored dress expected of a career woman or a militant feminist for the niceties of a woman schooled in fashion. She has a pleasant, well-pitched voice; firm convictions and fiery zeal for any cause which she adopts.

Born in Lancaster, N. Y., in 1894, Dorothy Thompson is the daughter of a Methodist clergyman. Living in Lancaster until sent to Lewis Institute in Chicago, she graduated from Syracuse University in 1914 after becoming an ardent leader of the feminist movement.

From 1914 to 1920, her ambitions and energy sputtered along several paths. Trained as a teacher, she didn't want to teach. She hadn't thought of journalism. Instead she turned a volunteer work position in a woman's suffrage organization into a paid job, began to write copy for a New York advertising company and to do publicity for a social service project in Cincinnati.

In 1920 she got into newspaper work to get out of America. That's literally true. Miss Thompson knew that postwar Europe was a highly romantic place, filled with American expatriates who, inspired by the turbulence of the period, were supposedly turning out masterpieces of literature and art. She felt that somewhere in the midst of all that excitement there must be a job for her.

Her first break—and the one she considers her greatest—came when she sailed on a 12-day steamer loaded with Zionists on their way to an international conference in London. She had wanted to go on a fast boat, but hadn't had the money. Thus, as a passenger on the conference-bound ship, she made connections and learned so much about the Zionist movement that International News Service asked her to cover the conference.

Working for a while on space rates for the Philadelphia Ledger, she developed a fine news sense which soon began to startle the world with a sensational series of scoops. The climax came after 1927, after she had married and divorced the Hungarian and after she had returned to America to have a baby and to write under the name of Mrs. Sinclair Lewis. In 1932 she took back her old by-line, Dorothy Thompson, and created another sensation by in-

terviewing Hitler, but the climax itself came in 1934 when Hitler ordered her out of Germany and banned her book, "I Saw Hitler."

Today the Lewises spend the summers in Vermont, the balance of the time at Bronxville. Miss Thompson's press of work lately has caused her to lease an apartment in New York City where she prepares three columns a week for the newspapers and her broadcasts.

As unpredictable as the weather, "Thompson" has continued to charm and sear with her gift of sarcasm, satire and humor. Unlike Winchell, her comments are always national in scope. Her words are pithy and worth while. Her knowledge of many subjects is vast and her memory almost infallible. She is the Boswell and the Pepys of present times. Her mark on radio time will long be remembered.

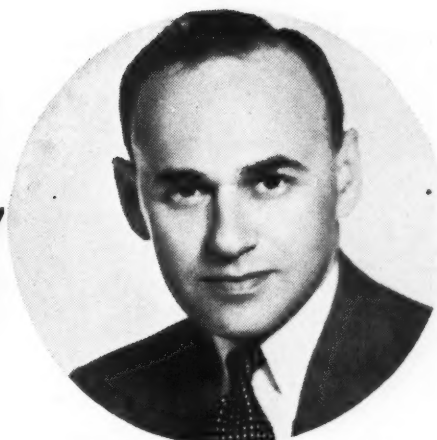
DO YOU KNOW YOUR RADIO?

1. Who is the possessor of the "Hello Joe" voice on Joe Penner's program?
2. A brother and sister team heard on NBC networks are descendants of Mark Twain. Who are they?
3. One of the Stroud Twins effectively puts his brother in his place with the line "I'm Happy About the Whole Thing." Which twin says it?
4. One of the pioneer dialect comedians uses fairy tales as the basis for his comedy sketches. Who is he?
5. What orchestra leader received over \$30,000 to lead a series of concerts for NBC recently?
6. Who is the mistress of ceremonies on the Hour of Charm?
7. What are the last names of Pick and Pat, CBS comics?
8. One orchestra has refused to change its style to meet current vogues, yet continues to hold its popularity. Whose is it?
9. Who are the Sisters of the Skillet?
10. A program with the novel title of "Dear Teacher" is currently heard over CBS. Who is the conductor?
11. Who's Who in the cast of Bachelor's Children?
12. What comedian has made the name of his wife a household word?
13. Radio's Grand Old Lady is 81 years old. Who is she?
14. A popular comedian on the Columbia network has an affinity for the letter "B" and several members of his company, including himself, have names beginning with the letter. Who is he?
15. What is the real name of "Clarence Tiffinguffer" heard on Myrt and Marge shows?
16. Who is the conductor of Uncle Jim's Question Bee?
17. Who is master of ceremonies of the Metropolitan Opera Auditions heard on NBC?
18. Who are The Merrimacs?
19. What is the name of the Wife Saver?
20. Who is the Singing Lady?

(Answers on page 79)

WHAT Television MEANS TO YOU

by DOC SCHNURMACHER



Gilbert Seldes, who says we will have television in N. Y. by 1939.

GILBERT SELDES* is the sort of a chap with whom one can get directly to the point without making any bones about it. I told him that the readers of RADIO NEWS wanted to know what television would mean to them as he saw things from where he sat. He was perfectly willing to talk frankly, without a slide rule in his hand, a mess of kilocycles in his voice or any fanfare of trumpets for the much publicized medium.

[*Several months ago, Gilbert Seldes, well known journalist, joined the staff of the Columbia Broadcasting System as "Director of Television Programs."—Ed.]

I suggested to him that as a typical radio listener with a moderately priced set at home, he tell me what I might expect of television; what the millions of dollars' worth of experiments in television meant in terms of my own radio enjoyment. This is what Mr. Seldes had to say:

"If you've got a radio receiving set in your home today, you'll probably be using it for quite a while.

"Television isn't coming in overnight. When it does come, it is going to be a gradual affair. As a matter of fact, I understand that there are just about a hundred experimental sets in the country today in spite of all that you hear about the imminence of television.

"When televised programs begin to take regularly to the air, the first home sets will be used by people who live in the larger cities. Since present television broadcast experiments in ultra short wave channels have demonstrated that clear reception is attainable only as far as the visual horizon—say, up to about 40 miles in our CBS broadcasts from the tower of the Chrysler Building, it will be understood that the first users of the sets will be in such cities as New York and Chicago. From there on

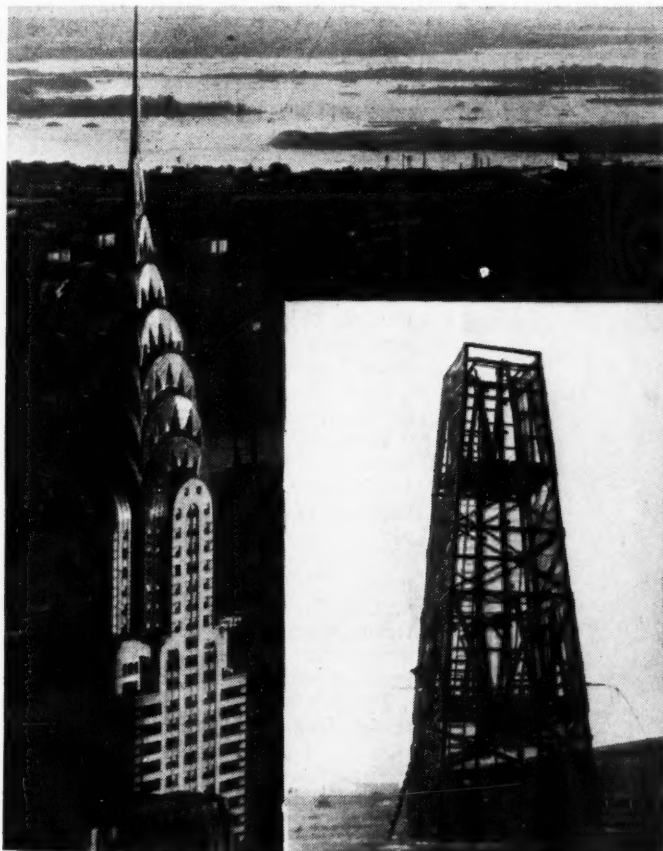
down to cities with a population of 100,000 or more, only about 5% of the country will be able to see television at first. That is, of course, unless radio engineers develop some sort of a system of booster stations to bring the televised programs to the smaller cities, towns and rural areas.

"Now let's look at the set situation. One radio expert has figured that it would take nearly 15 years to replace all the receiving sets now in use with television sets. That may be so. What is more important to the public at this time, however, is to know that a set which may be bought next week won't be obsolete next year.

"Do you remember 'way back when you had a crystal set to pick up the early radio programs? Well, if you've got that set

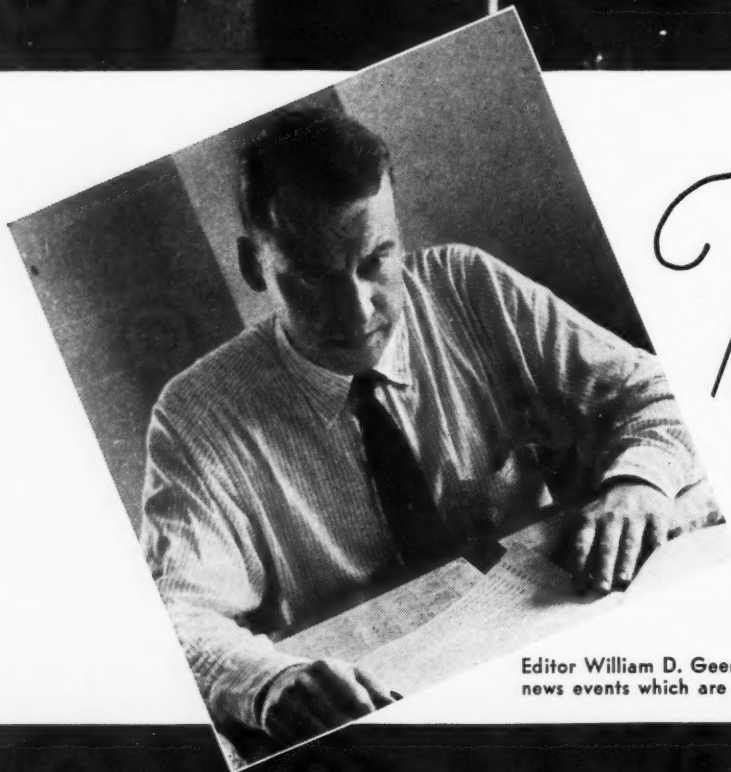
(Continued on page 59)

The Chrysler Tower (left) from which television broadcasts will be made. The test tower (inset) will be duplicated there.



One of the CBS 2½-ton television transformers. There are ten of these, each cooled by an extensive free flowing oil system.





Editor William D. Geer selects the news events which are dramatized.



by

HERBERT I. DIAMOND

How the world-famous program is presented; the complete story from the script-writing and casting to the astounding sound effects.

NO program has aroused quite the curiosity that has *The March of Time*. It has not only been the material, but the presentation that has had the public guessing as to how it is produced. Here for the first time, is the story.

Short as *The March of Time* may seem with its highly compressed dynamic action—but each minute ticked away represents 33 hours of preparation by 73 people: more than 1000 man-hours altogether to produce radio's history-making, history-recording March of Time!

Despite the fact that since its conception in 1931 by Roy Larsen this has been consistently one of radio's most popular, most-listened-to shows, *The March of Time* is publicity-shy and little more than rumor has ever reached a curious public baffled by a policy of no studio audiences.

Hardly one listener in ten thousand knows that it is Editor William D. Geer who selects each week the average of seven significant news incidents—a choice governed by news importance, influenced by considerations of dramatic balance, divers-

The MARCH

ity of content, sustained interest. It is Co-directors Homer Fickett and William Spier, alternating responsibility on successive weeks, who scrutinize so keenly every word, every inflection, every sound, with the sole objective of "naturalness" to the news scene rather than consciously dramatic "acting." Checker Harry Levin has created *The March of Time's* practically perfect record of accuracy.

Here, for the first time, you may "sit through" the preparation of this national newsfeature. Work starts on Saturday morning in the editorial offices—a completely separate organization with all the facilities of news magazine *Time* at its disposal. Nothing more explainable than an intuitive "nose for news" enables the writers to select five days in advance the items which will be newsworthy when *Time* marches on the air.

By Monday evening some 20 scripts are ready. Ten or a dozen are chosen for try-

Dress rehearsal of a program. Childish voices are not imitated. Youngsters make excellent actors because they are not self-conscious.

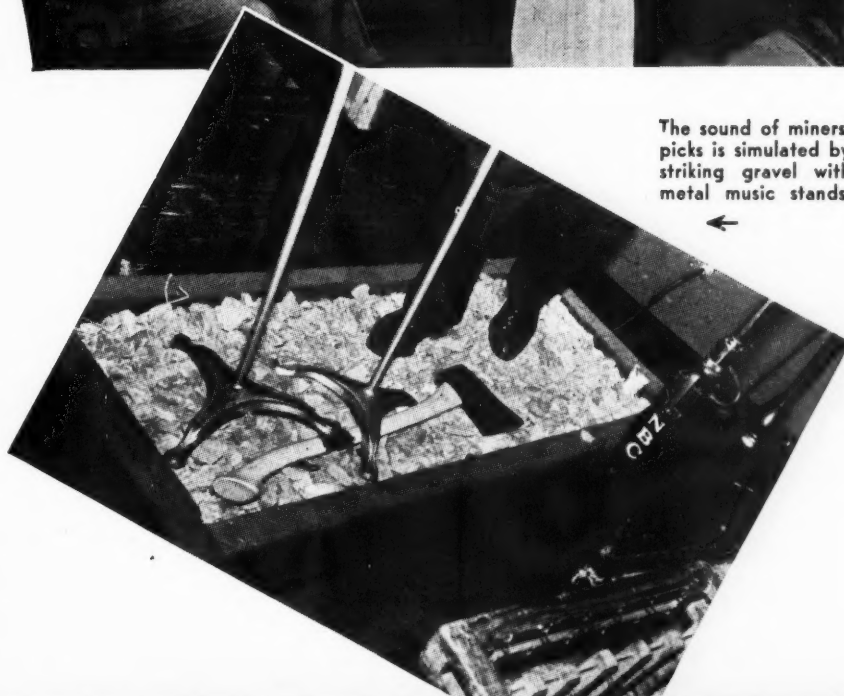
Rehearsals are recorded and then played-back for close criticism by the editorial staff.

out Tuesday when a regular cast and sound crew rehearse them for three hours. After audition, selection for the program is made, subject to the ever-present possibility that a "big news" story will break, demanding insertion of a new act, elimination of another. Such a circumstance was the Hindenburg disaster, occurring only two hours before broadcast time. Hurriedly a resume of dirigible history was climaxed with the flash news. Orchestra and sound provided an illusion of storm, explosion, frenzied cries, crackling flames, crumpling girders. An auditory "scoop" when only barest bulletins were available!

Expected news is easier. Several versions for various outcomes are often rehearsed: the strike is settled or it isn't, the bigwig dies or he doesn't. Checked against news wires the proper script is indicated at the very last second by the control room. Or an earlier-in-the-week incident may serve as drama with last-minute developments packed into the announcer's summation.

Tuesday night the special voices required on the week's show are called. The regular cast has been dubbed D-men by the *New York World-Telegram*. The D means "double." They are adepts at mimicry, each possessing half-a-dozen or more entirely different voices, individually capable of portraying on the same program characters as widely divergent as the Pope and Dillinger.

Bill Adams is President Roosevelt. Ed Jerome, who knew Spain's ex-king Alfonso



The sound of miners' picks is simulated by striking gravel with metal music stands.

of TIME

personally, mimics him so well that royal son Count de Covadonga commented, "It is uncanny! It is the very voice of my father!" The cast is supplemented by an "available list" of some 700 names with specific talents. Here may be found the voices of Swedes or Abyssinians, gnomes or elves—even the piping, squeaky voice that was once needed to represent a supposedly talking and singing mongoose found on the Isle of Man. To get on *The March of Time* list is the ambition of many a radio voice for this program has become to radio actors what the old-time Palace Theater was to vaudeville troupers. To have appeared on *The March of Time* is to have an open sesame to any radio director's sanctum. Out of 1200 voices auditioned during 1937, only 18 were suitable!

Tuesday night starts Musical Director Howard Barlow to studying the script, selecting 30 or more musical cues, each only from 4 to 8 seconds in length. A difficult task indeed, since the musical accompaniment is not intended to create an intellectual impression as music, but rather subtly

(Continued on page 81)



"Mussolini" Ted di Corsia.



"Stalin" Edwin Jerome.



"Hitler" Actor Dwight Eist.



Harry Parkyakarkus Einstein playing foot notes (pardon the pun), glumly thinks up some new gags.



Most polished of actors, George Arliss is rarely heard over the air; in fact only once in four years.

PERSONALITIES



→ Kiddies' idol, Irene Wicker, the Singing Lady, has been cited four times for service to childhood.

← Second only to her famous husband, Mrs. F. D. Roosevelt, is well liked by her radio audience.



Chester Lauck (Lum of Lum & Abner) sports a real Pine Ridge moustache, and enjoys a snack on the way to his broadcast. Lum is 31 years old.



Mr. Larry E. Gubb
Philco Radio & Television Corp.



Mr. Jim Quam,
Quam-Nichols Co.



Mr. William J. (Bill) Halligan
The Hallicrafters, Inc.

RADIO'S PRESIDENTIAL GROUP



Mr. Lionel A. Hammarlund
Hammarlund Mfg. Co., Inc.



Mr. Leslie F. Muter, The Muter Co.,
Radio Manufacturers Association.



Mr. David Sarnoff
Radio Corp. of Am.

Jim Ameche started on the same program that put his brother on the road to fame; they cannot be told apart on the air. Both are consummate actors.



Just one of the Ameche Boys; Don (above) came to radio and Hollywood two years ago March 6th. He is known as the man of a thousand voices.

Life-long friends, Comedian Ben Bernie and Columnist Walter Winchell, have had a pseudo feud for years.



SO YOU WANT TO BE A

newscaster

by

ULMER TURNER

Radio Editor, Chicago Herald & Examiner

THE evening does not pass that we do not hear one or more news commentators. As we listen to the smooth flow of voice dramatizing the events of the day, many of us have thought it easy, and could see ourselves in just that sort of a job. Simple problem—just read the papers to the folks. The more we listen, the more we are convinced that we could be a big success at this.

From mail, and from conversation, those of us who *are* news commentators, who words-eye-view world happenings, arrive at the conclusion that ninety per cent of the listeners could be classed in two groups:

1. Those who *believe* they could out-Boake Mr. Carter or out-flash Winchell, if given the chance; and

2. Those who *KNOW* they could.

It is to both groups—numbered in millions—that these paragraphs are directed. Out of this same group of hopeful listeners will come our Carters, Winchells, Lowell Thomases and Edwin C. Hills of Tomorrow. So there is hope for some of them.

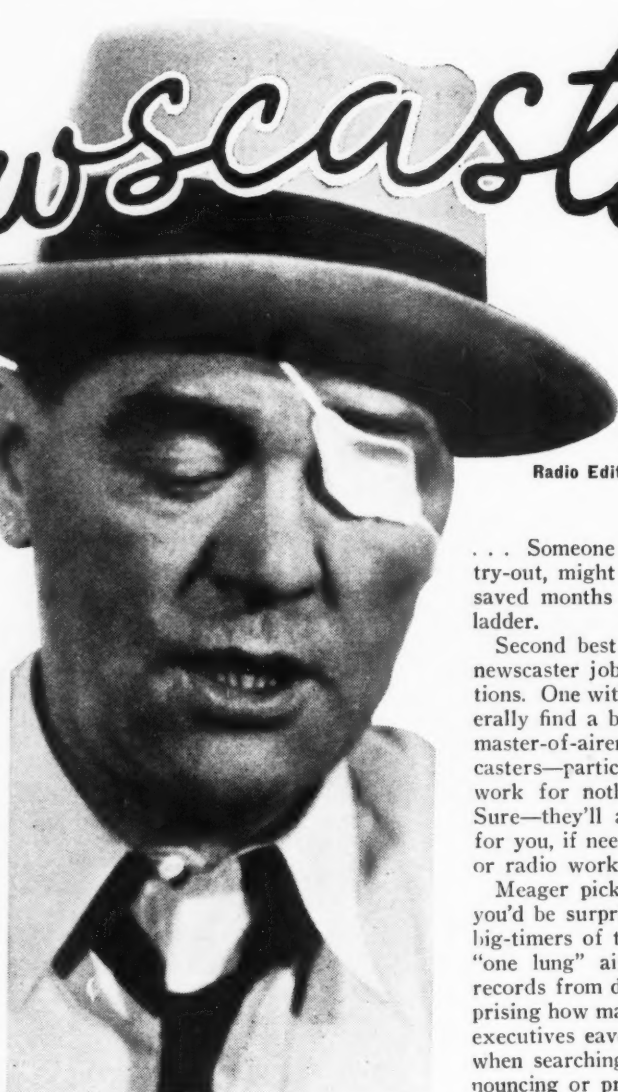
How to be among the fortunate? That is the question!

Naturally, one must have some qualifications to become a straight newscaster or a commentator. Favorable goals on the academic yardstick should be a college degree (ordinary A.B. is good), some travel, and newspaper reporter experience helps a lot—and contacts in all fields are of value.

Having these or reasonable substitutes—then what?

If I were to start over again, I'd make myself realize that ability is responsible for ten per cent of one's success in this field, luck the other nine-tenths. No one doubts that there are at least a thousand men in this country who could out-perform radio's current crop of Piersons, Kaltenborns, etc., when it comes to winning friends and influencing customers by voice. The only drawback to these aspirants is—most of them will never be discovered.

So, getting "discovered" is the first job. Neophyte broadcast bulletineers nowa-



The first and fastest of the newscasters, Floyd Gibbons, who will shortly return to the air.

News commentating is not the same as reading the paper over the air. The author, well known to listeners as the "Globe Trotter," tells the difficulties of his trade.

days may well ignore one of the former cardinal "don't's" and try first for a top berth!

If I were re-tracing my studio steps, I believe I would work up enough courage to strike out among the more influential stations. The larger ones.

There would be qualifications hurdles to jump, insults to be endured from well-meaning, talent-harassed secretaries. Chances are I'd never get an audition—but I'd try. So I suggest the same course for young men who feel they have the goods.

Odds are that if you *do* get the audition your efforts will be wasted on super office boys sitting in place of talent scouts we like to believe are always listening.

But that one chance is worth the effort.

... Someone in authority might hear your try-out, might like it. And you would be saved months of tedious climbing up the ladder.

Second best route to a commentator or newscaster job is through the smaller stations. One with fair qualifications can generally find a berth on the announcerial or master-of-aireromies staffs of such broadcasters—particularly if he is willing to work for nothing, or little, as a starter. Sure—they'll arrange part-time schedules for you, if need. You can continue school or radio work meantime.

Meager pickings? Most assuredly, but you'd be surprised if you knew how many big-timers of today got their starts on the "one lung" airlets that play phonograph records from dawn to dusk. It is also surprising how many big-station and networks executives eavesdrop on the "one-lungers" when searching for someone to fill an announcing or professional spot. It's easier than auditioning thousands of raw beginners.

Let's assume that you have landed on one of the smaller stations, as the voice between changes of phono needles. If you still yearn to be a commentator—and are not lured by the almost equally remunerative post of commercial announcer

—then ask the manager of the station to keep you in mind next time an opening occurs. If the airlet does not have a newscast, try to interest him in instituting one.

News for such purposes is supplied by the major wire services—at a price, of course. Teletype machines (automatic typewriter via telephone lines) bring bulletins from the nearest I.N.S., United Press or Trans-Radio branch. Or, possibly some hookup may be arranged with a newspaper not already on the air.

Stations are strict on *one* point. They insist upon clean, accurate comment from their mikemen. Beyond that, one is pretty much his own boss . . . and censor. A straight newscaster, *i.e.*, one who reads the news without too much comment, has noth-

ing to fear; good taste will not offend new listeners.

What is good taste?

Nowadays, when proper conduct is a moot question, one may find the line of demarcation somewhat confusing. Even Emily Post spills a few berries on the table cloth, occasionally. On the air, however, berry spilling just isn't done. The gentleman who calls a preacher a "sky pilot" will probably be drowned in a flood of complaining fan letters, next morning.

Small town chaps are lucky at this point. Anything that is Hoyle on Main Street is all right on Broadway—but not vice versa. And, Main Street being the longest—doing the most buying—it is far more important. Pattern your speech in the manner you'd use to address a formal gathering in your own parlor—a mixed gathering—and you'll never go wrong.

To begin with, leave controversial matters to Boake Carter and General Johnson. They can be counted on to take care of the

you *might* get the break. I know of many announcers who did get their first real breaks from such instances. Phil Stewart, the "Lady Esther-Wayne King" mikeman, is one of them.

If you've progressed so far that you find your ribbon mike hooked to 5,000 watts, some day, you are ready to begin getting serious. Should MacTavish Oat Flakes come along and say they'd like to have you announce their Willie Winkle Hour—at a good salary—my advice is to take the job and forget your commentating aspirations for the time being.

How about censorship?

Radio censorship is like Mark Twain's weather. People talk about it—wax indignant at times—but few ever do anything about it. Least of all the stations. In the interests of free speech, it's just as well they don't, as long as this freedom is not abused by mikesters.

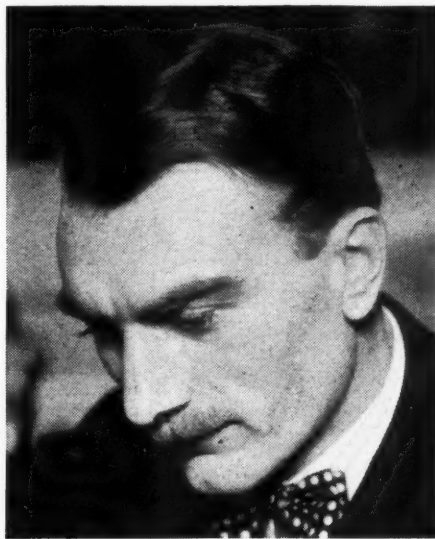
Sure, you'll find sex in the news. But there is a difference: in a newspaper, it can



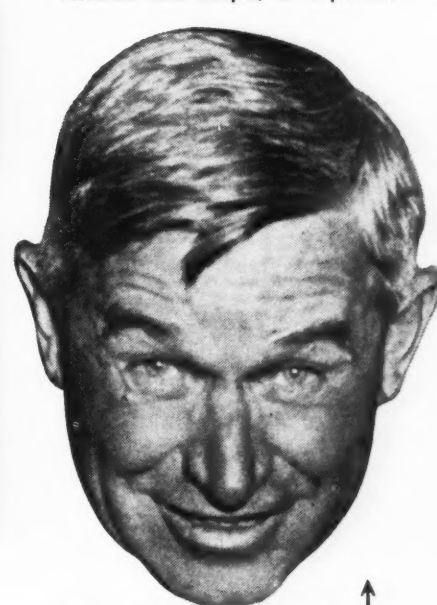
Gabriel Heatter, who does his own research and scripts, is impartial.



Lowell Thomas, world-wide traveler, receives spot news while broadcasting.



Boake Carter, accused by some as being a pacifist, is a keen diplomatic observer.



First all-American commentator, the beloved late Will Rogers.

ocean mail subsidies and the White House, respectively. Both are specialized, volatile fields.

Sex? That's just as well left alone, too. Both NBC and CBS ignore it almost completely—and they've never had any complaints. [Not until one day they forgot to ignore it and Mae West shuffled along. —Ed.]

During the time you are newscasting—or announcing—from a small station, send "feelers" out and into larger studios. Drop courteous, short notes to Program Directors of the big stations, asking them to listen to your efforts when convenient. Be sure to list accurately when and where you may be heard. Don't ask them to criticize your efforts. They hear that sort of pseudo-frankness all day and are thoroughly fed up on it. Ask merely that they keep you in mind when they need an announcer.

Chances are good, anyway, that a studio page boy—or perhaps the director's wife's uncle—will get the job when it opens. But

be read at convenient times, its reading is personal. On radio, your item about Trixy Golddigger going steady with Daddy Millions—and shooting him one night—will be heard alike in poolrooms, drawing rooms—and by the crowd gathered to practice next Sunday's hymns. The latter won't like it and what's more they'll write in to complain about it. Unfortunately, most of the boys at the poolroom don't write!

Racial slurs have no place on radio. Even a tendency toward them is a mark against a commentator. One who is so intolerant as to indict entire races because of fancied incidents he holds against a few is like a firecracker in a powder factory. He is liable to explode any minute and in addition to ruining himself will damage the entire station. So be careful.

Cautious as you are, there will be times when you will let colloquialisms get the best of you. If you are from the West, you might abbreviate Japanese to "Japs." You won't mean anything by it but the

(Continued on page 57)



Edwin C. Hill is in a class by himself.

Finding Hidden Treasure



The loop antenna is sighted along the approximate line on which a pipeline is supposed to have been laid.



The searcher carries a small receiver which picks up signals from the portable loop transmitter shown at the right. A high-pitched buzz sounds in his earphones and a meter dips when he passes over buried metal. It can be used to 250' depth.

by MAXWELL REID GRANT

A portable loop transmitter and a small receiver have made the mythical "divining-rod" an actuality. With this instrument, subsurface metal can be located.



The metalloscope is so rugged in construction and so compact that it may be packed in the luggage compartment of a car and carried about.

"X-RAYING" the earth in search for lost objects ranging from buried treasure to water pipes is the unusual occupation of a western radio engineer, Dr. Gerhard Fisher of Palo Alto, California. Applying much the same principles as he used in designing navigation instruments for naval airplanes and the ill-fated *Macon*, he has developed a metalloscope which reveals the presence of buried metallic objects at depths up to 150 feet.

Carrying his instruments mounted in a light wooden frame, Dr. Fisher walks slowly along until a dip of a meter and a sound in his headphones indicate that he is passing over a conducting body. Waves from a small low-frequency radio transmitter working between 50 and 175 kilocycles set up an invisible field about a horizontal loop aerial carried in the rear portion of his instrument. Before him he carries a light six-tube receiving set, placed so it receives equal and opposite impulses from the transmitter, thus balancing out any sound. But if he passes over a metallic body, the lower wave penetrating the

earth is absorbed, throwing the circuits out of balance and resulting in a high-pitched buzz in the headphones.

So accurate is the device that buried water pipes can be located within half an inch. Public utility companies rent or buy the instruments for spotting lost water pipe connections, valves, or manholes. Recently a sewer contractor cut into an important telephone cable and did damage that cost \$1,200 to repair. Now he uses the metalloscope to detect buried objects before he runs into them. A major oil company engaged in digging up a 400-mile buried pipeline has each of its big ditching machines equipped with the device mounted just ahead of the operator's seat, so hidden curves of the pipe may be followed without retracing.

Recently the thirty-year-old water supply system of a California university developed a leakage that made it necessary to locate certain valves for which a map no longer was available. To save digging up acres of fine campus sod, Fisher and his

(Continued on page 59)



Married to a blonde menace—
comedienne and singer of light
opera—a bit of Scotch.



A mad foreigner—heckler of a
banjo-eyed comedian—mur-
derer of the king's English.

(For answers see page 48)

Ten years of failure didn't stop these
two from reaching the pinnacle in radio.



Guess Who!



The broadcast finished, a famous comedian packs
away his instrument. Don't be fooled by this one.



The lowest pressure salesman who is really
a high pressure one. His knocks are famous.



A famous (?) violinist and a now famous car.
Together, one of the most amusing teams heard.



Diminutive radio personality with bomb-
shell delivery and style; Cantor discovery.

SCOTT'S NEW 24 HOUR AUTOMATIC TUNING RECEIVER



By inserting the proper key, the set will automatically tune any sequence of programs over a 24 hour period.

WHATEVER else 1938 may bring, one thing seems to be certain: It has brought a revolutionary change in radio receiving sets, as revolutionary as the introduction of the allwave receiver was a few years back.

The newest receiver doesn't even look like a radio (something women have been hoping for all these years). All dials, knobs, switches have been eliminated. The instrument may be had in the shape of an attractive book case. Or it may be concealed completely in the wall.

It is completely remote controlled. A small control keyboard, weighing only a few ounces and no larger than the palm of the hand, resting on the arm of a chair, beside you at the dinner table, or at your bedside, enables the listener to select instantly any one of twelve stations or re-creating the world's finest music in recorded form. A flick of another key gives you the volume desired. It may be swiftly stepped up from a faint whisper to full auditorium volume. Thus repeated steps across the room to bring up the volume or reduce it are eliminated.

But this is only the beginning! You may select your entire radio entertainment for a full day in advance. Get out your favorite paper; pick the programs you want to hear; note the stations; insert a few simple keys (a different one for each of eight stations) into the dial of a new radio-controlling clock. And the robot radio does the rest—bringing in automatically at the exact moment the programs start—what you have selected. But more than that: If you desire an intermission of silence between one program and another the clock will turn off the current and station at the end of the program. Later at the appointed minute the program you want will be tuned in. You need never more miss a program you want to hear because you forgot it at the last minute. The robot radio doesn't forget.

If you like you may have your favorite

waker-upper sound off and get you up in the morning. If you wish to go to sleep to relaxing music the receiver will provide this service and turn itself off after you have counted the last sheep.

Still more: If the program the clock has brought in fails to please, you may select another through the control keyboard without moving from your easy chair. This sort of interruption does not affect the remainder of the prearranged listening schedule. At the next appointed hour the robot radio reverts to the next item in your listening.

The volume also is automatically controlled. Unless changed by hand, every station will be heard at the same level as will the recordings. The set offers a potent weapon against sponsors who offend listeners in whose homes they are guests. That little key providing instantaneous decrease of volume makes it possible instantly to eliminate entirely, or make inaudible, high pressure and long drawn out and irritating sales talk.

The clock, upon which hinges the entire advantage of this set, is of a standard electric type, geared (with a ratio of two to one) to a ring an inch wide which revolves about the dial of the clock once in 24 hours. It is a twelve hour clock but it functions the full day around for the radio listener.

The ring is divided with circular perforations at each 15 minute position for 24 hours—95 altogether. Into each hole one may slip circular selecting pins or keys, about $\frac{3}{16}$ inch in diameter and from 1 to $1\frac{3}{4}$ inches in length. These are numbered on their heads from one to eight, each number corresponding to a different channel which may be arbitrarily assigned. Thus No. 1 might be WLW; No. 2, WJZ, and No. 3, WOR, and so on.

The pins are only eight in number and of different lengths. At the end of each pin is a circular metal band which comes into contact with a silver plated wiping brush as the whole ring revolves, at the stroke of each hour (or quarter hour) interval. An insulated collar reaching back from the contact band to the exposed head of the pin keeps it from making a circuit with any of the seven other brushes, except the one with which it is keyed, through its specific length.

In addition to the pins described above there are two other auxiliary types serving additional purposes. One designated with an S on the head may be inserted at the hour when you desire the radio to be turned off for the night, or merely for an intermission during which you find nothing of interest to listen to.

Still another type, distinguished from the number ones by a color, may be used to turn the radio on. Instead of a single contact band, it has two, one to turn the power

(Continued on page 60)

ON THE COVER WE HAVE . . .

CLAIRE TREVOR, whose picture appears on the cover, is a graduate of the American Academy of Dramatic Art, who made her stage debut in 1930. Subsequently she appeared in numerous Broadway plays, including "Whistling in the Dark" and "The Party Is Over."

At the time that she was appearing on the stage she made several movie shorts in New York City. Finally the screen took all of her attention and she arrived in Hollywood in 1933 and has been there ever since. Among famous pictures in which she has appeared are "Dead End," "The Mad Game," "Dante's Inferno," "Spring Tonic" and "The Black Sheep."

Miss Trevor is, of course, well known for her role of Lorelei in the "Big Town" series over WABC-Columbia Network every Tuesday evening. On this program she is co-starred with the screen's Edward G. Robinson.

It seems particularly fitting that "Lorelei" Claire Trevor, who is the secretary of the Editor in "Big Town" series, should finally have her picture on RADIO NEWS; we do a bit of exposing too. Miss Trevor, who is very athletic, is slim and blond. Her height is just a shade over five feet.

The cover was made from a natural color Kodachrome transparency. The photographer was Walter C. Seigal of the New York CBS staff. The camera was a Leica Model G with a Leitz f 1.5 lens. General illumination was provided by one 500 watt Mole Richardson Hollywood Spot and auxiliary lighting was effected by one 1500 watt Mole Richardson Rifle Spot and one 1000 watt Saltzmann Spotlight. Using Type A Kodachrome film Seigal made an exposure of 1/60 second at aperture f 2.5.

It is hard to say whether Miss Trevor's popularity is due to her radio performance or by her moving picture and stage work. She is a talented, versatile and beautiful artist.

STUDENTS CAMPAIGN BY RADIO

STUDENTS at the University of Vermont, in Burlington, are taking advantage of gratis time offered them by the local radio station, WCAX, to gain valuable microphone experience. In their off-campus activities, several of the students have tried their hands at everything in the way of radio entertaining.

Four such students worked up a comedy revue, with music, which they presented each week for several weeks. The complete script, including gags, characters, and everything was written by Student Larry DeShaw who was also the program's featured singer.

When the University student body recently staged the annual "Kake-Walk," a traditional affair in which students campaign for the title of King and Queen of the ceremony, the five King candidates and the three Queen aspirants brought their campaign talks into the local homes via electioneering over WCAX.

RADIO and the SPANISH WAR

by THOMAS E. GOOTEÉ

The author, recently returned from war-torn Spain, tells graphically of the use of radio in many war and propaganda activities there.



A radio operator at work in a field station.

To The Editor,
Radio News,
Chicago.

Dear Sir:

I AM writing in answer to your recent query in RADIO NEWS regarding my whereabouts and (mis) adventures in the Spanish War. I have been back in the United States for quite a few months, and am now employed by the National Broadcasting Co. as a Field Engineer. During the time I was in Spain and Morocco I received more than my normal share of the real horrors of war, and therefore have had little inclination to write or discuss the matter previously. Sherman was quite right about war.

Over a year ago RADIO NEWS published a short account of my war reactions which I succeeded in mailing back to the United States at that time without the customary

censorship. I was then located and working in the International City of Tangier, Morocco. Shortly after that I returned to southern Spain, and resumed work in the ranks of the Rebellion. There followed a kaleidoscopic series of nightmarish experiences which I have little hope of forgetting soon. I advanced with the Insurgent forces as they pushed northward through Sevilla, and later through Badajoz into the Guadarrama Mountains far west of Madrid. Lack of co-operation in supplying parts coupled with political differences eventually caused me to leave the battle-scarred land of Spain for safer places, the events climaxing my actual departure reading now like an Oppenheim spy mystery. The fact that I am alive today is due to my being more of a diplomat than a radio engineer.

Before proceeding I should like to emphasize that this letter should *not* be construed as being propaganda for either side; I hold no dear feelings for the Rebels or the Loyalists. The original cause of the war has been lost in the hopeless confusion of a mad slaughter; foreign intervention has transformed a revolution into an International War.

Since the early fall of last year the war has practically been a stalemate; activity has been confined to an occasional advance, by one side or the other, followed by a retreat within a few days or weeks. Naturally much blood has been shed. Both sides are guilty of much wholesale destruction of life and property. Practically all of my work was with the Rebels, but I gained a deep insight into the Loyalist

(Continued on page 71)

After a heavy bombardment in Madrid the populace emerges from their shelters to listen to further propaganda broadcasts over radio-actuated public address systems.



"RADIO Gadgets"

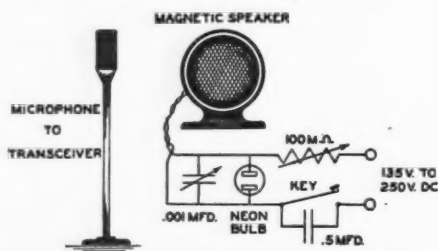
Fish Pole Antenna

THE manufacturers, quick to take advantage of the increasing interest in automobile radios, have introduced several new types of aeri-als for roof, door and bumper mounting. One of the simpler types that the experimenter can make for himself is the bumper rod antenna. Purchase a cheap one piece metal fishing rod, one that has a wooden or some kind of an insulated handle. You are not interested in its properties as a fishing pole and therefore a cheap rod will answer the purpose. Solder a lead-in to the bottom end of the metal rod and then fasten the pole to the rear bumper by means of an improvised iron strap and two long stove bolts. For this job it will be necessary to prepare two holes in the handle to take the bolts.

Several ways will present themselves for supporting the antenna. On some cars it can be fastened on the bumper rod, on other makes, it can be mounted on the bumper support. It is suggested that the rod be given a coat of aluminum paint to prevent rust.

Variable Tone Modulator

THE majority of manufactured or home-made 5 meter transceivers are not equipped with tone modulation for c.w. work. It is a simple matter to



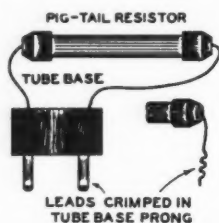
add this feature without molesting the transceivers in any way. Assemble a $\frac{1}{4}$ to $\frac{1}{2}$ watt neon bulb, a .001 mfd. variable condenser, a 100,000 ohm variable resistor and a key as shown. A $\frac{1}{2}$ mfd. condenser should also be connected across the key. All this material can be taken from the junk drawer and assembled on a small board alongside or attached to a B eliminator of reasonable power.

Connect the output to an old magnetic speaker, turn on the power and press the key. The neon bulb will oscillate and produce a tone in the speaker. Its strength can be controlled by the variable resistance while the pitch can be varied from a low note of only a few cycles to one of the highest audible frequency by means of the tuning condenser. The note can be transferred to the transceiver by placing the

microphone close to the speaker and will not interfere with voice unless the key is depressed.

Plug-in Resistors

FOR experimental purposes where resistors have to be changed often as in biasing various types of tubes, control networks, etc., a plug-in arrangement is very desirable. The following



idea has worked out very successfully.

The shells of several old tube bases were sawed off close to the bottom with two of the prongs left intact, except for cleaning out the wire and solder. Next the resistor was mounted as shown in the drawing with the leads crimped so that when said leads were pressed into the prong they make a good connection and support for the resistor. Sockets were then fitted to the receiver or were then fitted to the receiver or breadboard layout and wired into the resistance circuit.

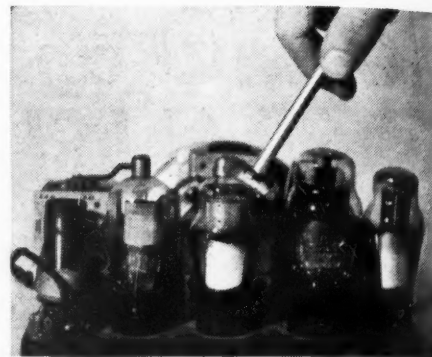
It is a simple matter to pull out these plug-in resistors from the socket to substitute a resistance of a different value. For permanent use the resistor leads could be soldered into the tube base prongs and the latter inserted into the socket for good or until the resistor burned out and required replacement.

Selecting Antenna Wire

IN selecting wire for antennas it is too often the practice to simply go into a radio store and ask for so many feet of antenna wire, taking pretty much whatever the dealer offers. Where the wire is to be used for an ordinary "L" type antenna for broadcast reception there is little harm in this procedure because the exact length of the antenna is not critical, nor the strain on the wire great.

Where the antenna is to be used for transmission, or for a self-resonant receiving antenna greater care is needed. Here the antenna length is critical and usually the antenna must be stretched taut under a considerable amount of tension. Moreover, if a tree is used as a support the wire may be under tremendous strain during storms. For such uses, solid wire is usually recommended and soft-drawn forms.

Hard-drawn wire is recommended for such critical service. The reason is that it has close to twice the strength of the soft-drawn variety; and what is



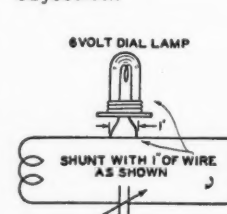
The "Sterling" double eraser pencil makes an excellent tool with which to test for defective tubes and for shorts. When knocked against a defective tube, crashes will be heard in the speaker; if the tube is OK, the noise will have a ring to it. Shorts will show by scratchings and crashes in the loud speaker.

more important, soft drawn wire under strain will stretch as much as 25 per cent as against less than 1 per cent for hard-drawn wire of the same size and subjected to the same strain. Actual tests made on No. 12 wire showed the soft wire broke at 150 pounds pull whereas the hard-drawn broke at almost exactly 300 pounds. Just before breaking, the soft wire had stretched from 5' to 5', 11", whereas when subjected to the same strain of 150 pounds the hard-drawn wire showed no appreciable stretch. At just short of 300 pounds pull the hard-drawn wire showed elongation of approximately $\frac{1}{8}$ inch.

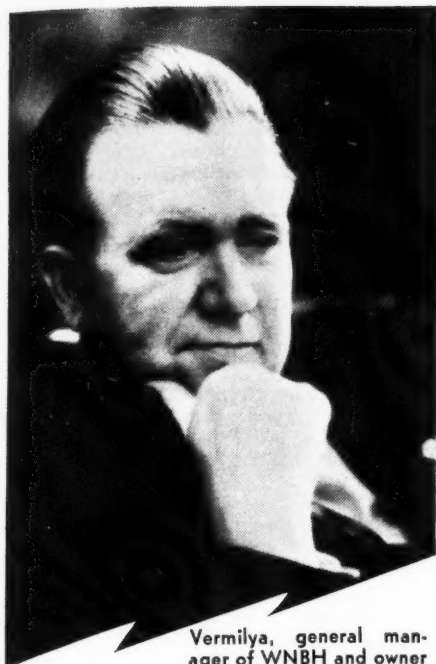
To avoid sag, and for the antenna length to remain fixed, use hard-drawn wire. If the strain is likely to be greater than 300 pounds use copper-clad steel wire which is still stronger.

A Sharply Tuned Wavemeter

DESPITE monitors and frequency meters the old style absorption type wavemeter still has its place in amateur equipment. Harmonics have no effect on its operation and with intelligent use it will give a definite check on frequency to a limited degree. In the past its chief handicap has been broad tuning and it was difficult to obtain a true reading. Presented herewith is a simple method for overcoming this objection.



Instead of connecting the indicating lamp in series with the tuning coil and condenser as in the usual manner, shunt the lamp across the circuit as shown in the drawing. Connecting the device in this way and using a 6 volt dial lamp the tuning will be unusually sharp and when carefully tuned the instrument will be able to indicate the transmitted frequency to within a narrow percentage of the true frequency. Employ bushbar for the leads as they can also serve as supports for the lamp socket.



Vermilya, general manager of WNBH and owner of Police radio WPFN.

NO. 1 HAM of these United States is a title which any amateur might well envy. The lucky pioneer owning this title is Irving Vermilya of Mattapoisett, Mass.

The story of Vermilya's introduction to radio starts way back in 1901, on the cold bleak coast at St. Johns, Newfoundland. History was being made and a new industry born. Guglielmo Marconi had received the letter S without the use of wires or cables from Cornwall, England, and wireless telegraphy entered its embryonic stage. Conspicuous in the group of scientists and engineers gathered to witness the performance was a smooth-faced lad of eleven years, his frame tingling with excitement and his head buzzing with questions.

It all happened when young Irving heard the news of Marconi's experiments in his home town of Mt. Vernon, N. Y., and determined to visit Newfoundland. Parental permission was granted when the family minister, Dr. Charles H. Tyndell, offered to accompany the lad. Marconi gave the youth a cohearer and tapper, crude instruments used in the reception of wireless telegraphy. From these young Irving built

No. 1 HAM

by PAUL W. STILES

In 1901 Irving Vermilya built his own receiving set from parts given to him by Marconi. In 1912 he received license No. 1. After 37 years he is still at it at his station WIZE.

his first receiver. There being no sending stations in those days, the best assurance he could get that the set was working was the ringing of doorbells along the street as the postman made his rounds.

There we have the basis for Mr. Irving Vermilya's claim that he was the first amateur in the country to get an aerial up, and to investigate the mysteries of wireless.

When still a boy, Irving learned of the repeated arrests of an experimenter in New York City. Visiting him, he discovered the reason. The New York apartment of the experimenter, William Smith, contained a large cannon wound with 18 miles of wire and powered with several hundred home-made storage batteries. When the current was turned on, the effect was of a powerful electro magnet. When Smith demonstrated to young Irving, pots and pans flew from their accustomed places in nearby apartments and smashed against the wall nearest the magnet, clocks were stopped, young Irving's pockets containing metal objects were pulled toward the electro-energized cannon.

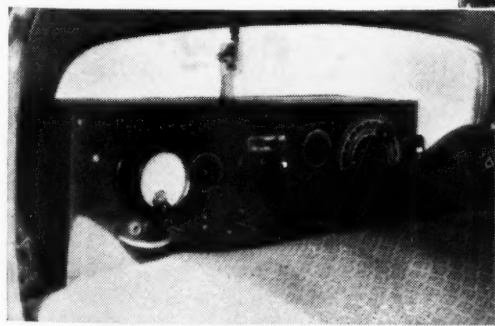
The visit, however, resulted in arrangements being completed for the building of a spark coil wireless transmitter. And thus the first wireless transmission from New York City, as far as can be determined, took place when Irving, in Mt. Vernon, re-

ceived Smith's messages from New York.

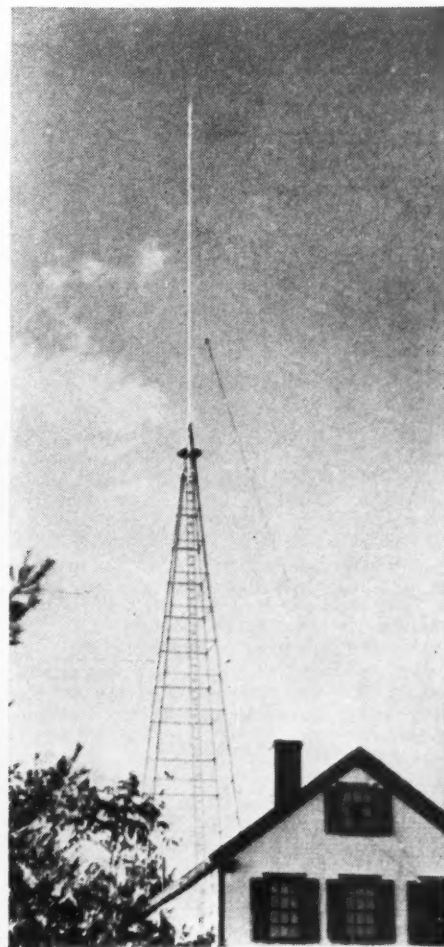
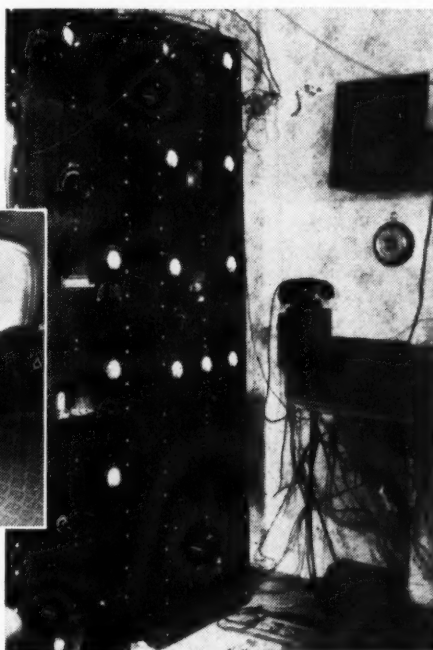
On his way to manhood, Mr. Vermilya went through the various stages of spark coil, rotary spark gap and Audion tube methods of wireless transmission. Incidentally, in those days, Audion tubes had to be bought secretly for fear of patent stealers. Crystal, silicon, carborundum, and electrolytic detectors were used.

By 1907, ships began to be equipped with wireless and Vermilya took his first job—wireless telegrapher aboard the Red "D" Line steamer, *Caracas*, to South America. Then followed other jobs of the same nature aboard many ships that carried him to many ports of the world. He likes to tell of the winter he was ice bound

(Continued on page 64)



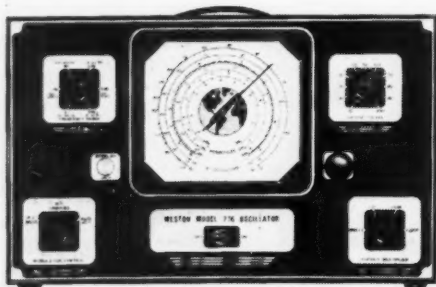
A 30-watt, 56 mc. transmitter and receiver (above) installed in Vermilya's car allows him to operate WIZE by remote control. The home "shack" contains the extensive up-to-date transmitting equipment shown at the right.



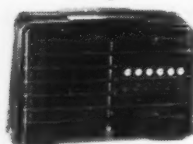
Above: Globe-circling signals emanate from this 175 foot mast. It is visible for miles around.

What's **NEW** in Radio

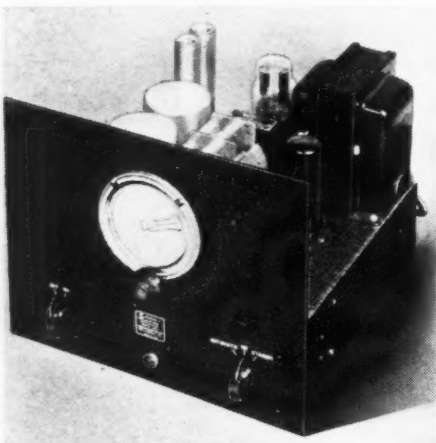
A new A.C. operated test oscillator featuring precision control both as to frequency and output level, has just been introduced by the Weston Electrical Instrument Corp., Newark, N. J. The direct reading 330-degree dial, with six frequency



scales averaging over a foot in length, is individually calibrated with hand-drawn scale divisions. Provision is made for r.f. output modulated at 400 cycles, for continuous wave output (CW), and audio frequency oscillation. A wobbler jack permits frequency modulated input to the unit. Four tubes are utilized in the circuit.



The Emerson Radio and Phonograph Corp., 11 Eighth Ave., New York City, introduces a new push-button automatic tuning receiver, model BE198. It is a 5-tube a.c. operated and has provisions for six different stations, easily changeable from the front of the set.



The Meissner Mfg. Co., Mt. Carmel, Ill., announces the "SIGNAL-SHIFTER," a variable-frequency, electron-coupled exciter unit with ganged buffer stages, designed for use with amateur transmitting equipment to enable the operator to conveniently change the transmission-frequency from his operating desk. Five sets of three plug-in coils for each set provide for operation on the 10, 20, 40, 80, and 160-meter amateur bands. The "SIGNAL-SHIFTER" is link-coupled directly to the final stage of a low or medium power transmitter or to the preceding amplifier in a high-power transmitter. Power output is more than sufficient to drive a conventional power stage such as RK-20's, 802's, 807's or similar tubes directly on the operating frequency without doubling.

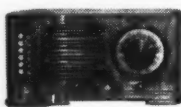


The accompanying illustration shows the microphone call letter plaque put out by Joseph Louis Babinger, 191 Herkimer St., Buffalo, N. Y. Different size models are available to meet the various types of microphones. Any combination of call letters can be accommodated.



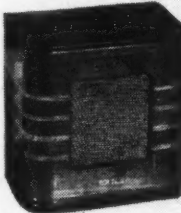
The accompanying illustration shows the microphone call letter plaque put out by Joseph Louis Babinger, 191 Herkimer St., Buffalo, N. Y. Different size models are available to meet the various types of microphones. Any combination of call letters can be accommodated.

The Electro-Voice Mfg. Company's model 106, modernly designed carbon microphone, is designed for low noise level and is equipped with a combination locking stand and cable connector. The button current is 3 to 5 ma. per button for close talking.



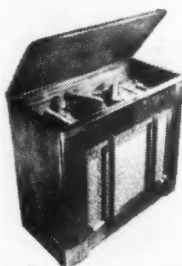
The new Emerson AY195 and AZ196 receivers incorporate automatic push-button tuning and a new type of tuning dial. Station settings can be changed instantly by twisting a coin in the slotted buttons on the front panel. The new "Miracle Dial" (as it is called) represents a new thought in dial styling.

Simplified group hard-of-hearing aids for use in churches, auditoriums, theatres, schools, etc., have just been introduced by the Webster Co., 5622 Bloomingdale Ave., Chicago, Ill. Single or double headphones are available and are provided with a small volume control box so that the individual may regulate the volume to his particular needs.



The R.C.A. Victor Co., Camden, N. J., introduces a new compact table type set with electric push-button tuning. The tube equipment comprises a 6J7, 6K7, 25Z6G and a 25L6G.

The R.C.A. Victor automatic-phonograph radio, Model U-106, employs 9 tubes, with 2 6F6's in the output stage. The receiver has a tuning range from 530 to 22,000 kilocycles. The phonograph has a constant speed motor with provision to change 10 to 12 inch size records automatically. A crystal type pickup is used.



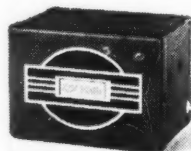
The Shure Bros., 225 W. Huron St., Chicago, Ill., "Tri-Polar" crystal microphone is made for either non, uni, or bi-directional response.

tional response. The control switch which is an internal part of the microphone case permits instant selection of any one of the above response characteristics.

To accommodate modern spark plug and distributor wire designs, Continental Carbon, Inc., 13900 Lorain Ave., Cleveland, O., have announced two new designs in molded bakelite carbon spark suppressors. The type S19 is a 5000-ohm suppressor which snaps directly on the ferruled brass stud of the spark plug. Type T20 is a 10000-ohm distributor suppressor with a special spring insert which assures firm contact with the spring clip on the ignition wire.

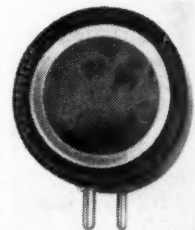
The model No. 312 "Speed-X," a new amateurs' practice key, made by the Les Logan Co., 646 Jessie St., San Francisco, Calif., is mounted on a mahogany finished wooden base. The metal key base is finished in black enamel and the instrument includes a circuit closing switch. Silver contacts are employed.

An announcement has just been received from the B.-L. Electric Mfg. Co., St. Louis, Mo., on their new "Filterpac." This is a compact power unit to operate directly from the 110 volt 60-cycle A.C. power line to provide 6 volts direct current for operating automobile receivers on a dealer's display stand. The manufacturer calls attention to the fact that it contains no tubes or liquids and creates no radio interference.



A line of 5 new motor car receivers were recently announced by R. C. A. Manufacturing Company. The model 8M-3 is a 6-tube superheterodyne with an output of 9 watts. If desired, an additional speaker can be connected.

This is the new Hickok Electrical Instrument Co.'s (Cleveland, Ohio) dry disc self-generating photocell of the blocking-layer type. The one-piece molded bakelite housing is provided with prongs to fit a standard radio tube socket, but can also be furnished with binding posts. It has an active surface of 1 1/2" diameter; sensitivity of about six microamperes per foot candle. The cell is intended for use in all kinds of light measuring apparatus footcandle meters, colorimeters, photographic exposure meters, etc.



PERSONAL NOTES

The appointment of C. A. Stoll, Dayton, O., as Clarostat representative for Ohio and adjacent territory, is announced by Clarostat Mfg. Co., Inc., 285 N. 6th St., Brooklyn, N. Y. Mr. Stoll is prepared to work out customers' resistance problems.

Whipple & Black, Detroit advertising agency, has secured the advertising account of Pioneer Specialty Co., a subsidiary of Wayne Screw Products Co., of that city. The Col-Mar "Operative Aerial" for automobile radios will be advertised. This is a concealed aerial which slides up and down by vacuum pressure at the touch of a button.

PREVENTION OF P. A. OSCILLATION

by DALE POLLACK

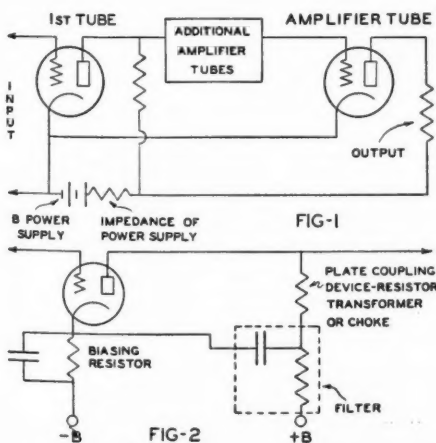
Often the most carefully constructed audio amplifier will give trouble. The author shows how to handle the usual bugs found in P. A. construction.

ONE of the difficult problems involved in the design of audio frequency amplifiers is that of preventing oscillation. An amplifier which seems to be perfectly well designed will be found, when constructed, to oscillate or "motor-boat" so severely that the amplifier is of no use.

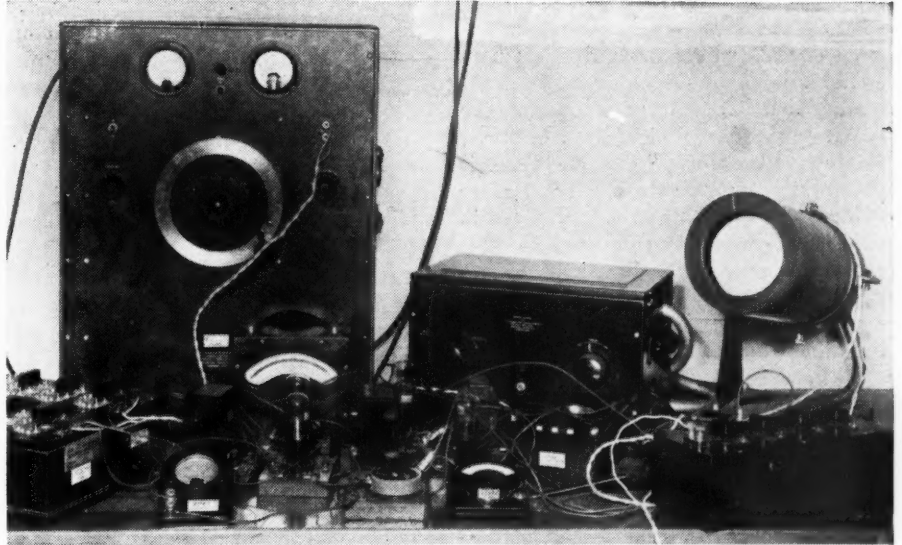
Oscillation in an amplifier is almost invariably the result of some kind of coupling between input and output circuits termed feedback. To prevent instability, therefore, it is necessary to determine the possible sources of this feedback, and to correct them. Feedback can occur by: coupling through the power supply, capacitive coupling between the elements of the amplifier, or inductive coupling between the elements. Each of these will be discussed in turn. The effect of radio frequency currents which may be present in the audio amplifier, when it is connected to a radio tuner, due to insufficient filtering or shielding, is not considered here.

The most common cause of instability is due to coupling through the power supply. Most amplifiers, with a voltage amplification greater than 500, will oscillate, if no precautions are taken to prevent coupling through the power supply. Feedback through the power supply is caused as follows: consider the skeleton diagram of Fig. 1, in which several tubes of an audio amplifier are connected to the same power pack. The power supply has a certain amount of internal impedance, determined by its design.

Variations in the instantaneous plate current of any of the tubes will cause a variation in the plate voltage of the power supply. Hence, the plate voltage



Two types of P. A. stage arrangements.



Some of the laboratory equipment used by the author in running down and tabulating the P. A. oscillations.

of the first tubes of the amplifier will be found to vary, exactly as the plate currents of the last tubes. The variation in plate voltage of the early tubes will be amplified, just as if it were a signal, and, if of sufficient amplitude and of correct phase, a self-sustained oscillation will result.

If the phase relations are opposed, then "degeneration" occurs, and the amplification over a certain frequency range is reduced. While oscillation does not take place, the effect is undesirable, and should be eliminated.

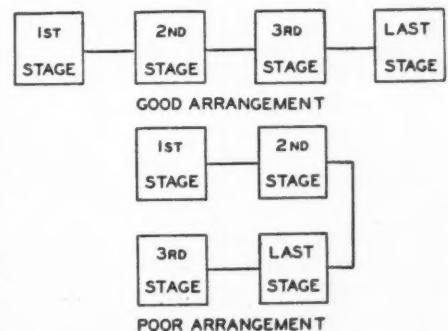
It will be noted that it is the first and last tubes of the amplifier that are principally concerned with the problem of stability due to power supply coupling.

There are two methods by which coupling through the power supply may be minimized. The first is to employ a separate power supply for the last stages of the amplifier, generally for the power output stage alone. A second method is to reduce the effective resistance of the power supply, by alterations in its design. One such alteration is the substitution of a mercury vapor rectifier tube for a vacuum rectifier, if one has been used. This improves the regulation of the power supply considerably, and tends to improve the stability of the amplifier. Another improvement that can be made in the power supply is effected by increasing the size of the output filter condenser. In mild cases of oscillation, dou-

bling the size of the output condenser will cause some improvement, but this method is seldom the most economical one.

The application of resistance-capacity filters in the plate circuits of the amplifier tubes, is the simplest and most practical method of preventing oscillation as shown in Fig. 2. These filters are inserted in the plate supply lead to each amplifier tube, and effectively prevent alternating power supply voltage variations from reaching the vacuum tubes.

The size of the condenser and resistance that may be needed in any case may be determined mathematically. Results must always be checked experimentally in order to evaluate factors that cannot be found analytically. To make the information available, computations and experimental work have been performed for a number of typical



Two types of circuits discussed by the author.

amplifier circuits, and the results are presented here. While the tabulations given in this article are not exhaustive by any means, they are sufficiently complete to be of considerable assistance in the design of amplifiers.

Table 1 lists various circuit combinations, and gives the "type number" of the filter to be used in each plate circuit. The "type numbers" are given in Table 2, where several equivalent combinations of resistance and capacity are listed for each filter type. The particular choice which is to be made between filters of the same type is determined by the direct-current plate voltage drop which can be permitted in the filter resistor, and by the allowable cost of condensers. In Table 1, two choices of filter types are given, one for a power supply of high resistance, and the other for one of low resistance.

A low resistance power pack is one employing a mercury vapor rectifier, with low resistance chokes, and a transformer with excellent regulation. If the power pack employs a mercury vapor tube, but the chokes have higher resistance and the transformer poorer regulation, it should be classified as a high resistance supply. A power pack utilizing a vacuum rectifier is always classed as one of high resistance, insofar as the selection of filters is concerned.

If there is any doubt in a particular case, into which class the power supply falls, the columns given for a high resistance pack may be employed most safely. Numerically, the dividing point

between high and low resistance has been taken at 300 ohms, as determined by calculation and from the slope of the regulation curve of the power supply at its normal operating point. Allowance has also been made for the shunting impedance of the output condenser.

The second cause of instability in an audio frequency amplifier is capacitative coupling between the input and output circuits of tubes in the amplifier.

Capacitative coupling may be inter-electrode, that is, within one of the tubes of the amplifier, or it may occur between the components of the amplifier external to the tubes. Ordinarily, inter-electrode effects are small enough at audio frequencies to be negligible, although occasionally these are troublesome. Only one case in this category is reported, that of a 79 twin triode.

To prevent coupling between the components of the amplifier, they should be so laid out that input and output circuits are as widely separated as possible. Arrange the amplifier "in line," one stage after another, rather than to fold it back upon itself.

When the gain required is large, 50,000 or more, shielding is employed to minimize capacitative coupling. As the desired gain is increased, the better must be the shielding. For voltage gains up to 100,000, it may be sufficient to isolate the input and output circuits, and to shield the tubes in the amplifier, but when greater amplification is desired, each stage should be isolated in an individual metal box. In a special ampli-

fier that has been constructed, with a gain of 5,000,000, it was found necessary to employ separate batteries for each stage, and to use multiple shielding, to the extent of shielding the batteries from each other and from the tubes. In practice, such elaborate designs are rarely met, however.

The last cause of amplifier instability is that due to inductive coupling between circuit elements. Leakage flux outside the magnetic path of a transformer, or of an iron core choke, induces a voltage in other similar parts of the amplifier. If the induced voltages are of sufficient magnitude, and of correct phase, instability results. This magnetic coupling can distort the frequency characteristic of the amplifier, and, if severe, cause oscillation.

Inductive coupling may be minimized, by employing magnetic shielding, or the transformer may be re-oriented so that the induced voltage will be of smaller magnitude. Many types of transformers are assembled in iron boxes, make excellent magnetic shields. Additional shielding may be employed about entire amplifier stages, if needed. An iron or steel box surrounding a stage, making good electrical and magnetic coupling at all its edges, and connected to the common return of the amplifier, serves a threefold purpose. It eliminates electrostatic and magnetic coupling between stages, and it prevents pick-up to the amplifier due to external magnetic fields, which might result in noise in the amplifier output.

-50-

TABLE 1

Amplifier Description.				Filter Required				
3-Stage Amplifiers (including detector, if used.)				(as given in Table 2)				
				1st Stage		2d Stage		
1st Stage	2d Stage	Input	3rd Stage	High	Low	High	Low	
Tube	Tube	Coupling	Tube	Res.	Res.	Res.	Res.	
57	56	Resis.	45	IV	III	II	I	
57	56	Resis.	2-45s	II	I	none	none	
57	56	Resis.	2-2A3	III	II	I	none	
57	56	Resis.	2A5	IV	III	II	I	
57	56	Resis.	2-2A5	III	II	I	none	
56	56	Resis.	45	III	II	I	none	
57	59	Resis.	2-59	—	IV	—	none	
56	56	Trans.	45	IV	III	II	I	
57	57	Resis.	2-2A5	IV	III	III	II	
56	56	Trans.	2-2A3	III	II	I	none	
57	57	Resis.	56	IV	III	III	II	
4-Stage Amplifiers (including detector)				2d & 3d				
1st	2d Stage	3rd Stage	4th Stage	1st Stage	2d & 3d			
Stage	Input	Tube	Input	High	Low	High	Low	
Tube	Tube	Coupling	Tube	Res.	Res.	Res.	Res.	
56	56	Resis.	56	III	II	II	I	
57	56	Resis.	56	IV	III	III	II	
57	56	Resis.	56	—	V	—	IV	
56	56	Trans.	56	V	IV	IV	III	

Tubes with similar characteristics to those in the above table may be substituted directly. For example, the type 76 may be substituted for the 56.

TABLE 2

Filter Number	C in mfd.	R in ohms
(Refers to Table 1)		
I	2	10000
	1	20000
	.5	40000
II	4	10000
	2	20000
	1	40000
III	8	10000
	4	20000
	2	40000
IV	16	10000
	8	20000
	4	40000
	2	80000
V	16	20000
	8	40000
	4	80000

The filter associated with any of the five numbers may be made up of any of the various combinations of R and C given above.

AIRLINE RADIOMEN

by CLANCY DAYHOFF

Transcontinental and Western Air, Inc.

Radiomen on the airlines must have not only a knowledge of radio but must also know meteorology, airline operating technique and despatching.



The pilots are in contact with ground stations regularly.

THE demand for capable radio operators in the field of air transport is increasing despite the hundreds of applications on file from amateur radio men and from licensed operators with experience at sea. This demand is accelerated by the development of blind landing facilities and other improvements in operations relying upon the use of radio in some form or another.

There is not exactly a shortage in qualified operators under the present scope of operations, but a limit to the number qualified in this type of radio work. Those employed at present have become proficient through experience gained on the job. Expansion in the use of radio by the airlines means more opportunities for radio men, but only if they have the necessary allied knowledge which makes their radio experience applicable to airline operations.

The possession of a radio license alone is not the key to an operator's position with an airline, but should be accompanied by a general knowledge of airline operations and the elements

which demand the use of radio as a means of conducting safe operations. Contrary to the custom at sea, an airline radio operator is required often to exercise his own judgment in the matter of information transmitted to pilots in flight. He must be capable in the subjects of navigation and meteorology in order to relay accurate information.

Primarily, the use of radio by the airlines is for the purpose of promoting safety in operations. The responsibility assumed by the operator while on duty, commands the use of all his knowledge relating to scheduled operations and conditions pertaining to the airway used by his line. The climatic changes which restrict visibility or affect atmospheric conditions on the airway must be relayed to the pilots accurately. In addition, the airline communications department keeps an accurate log of location, progress and the encountered conditions of its planes in flight.

Airline organization provides for competent meteorologists, dispatchers and superintendents at strategic points

along the airway, but occasions arise when the radio operator must exercise his judgment regarding local conditions.

An airline pilot walked into the office of the chief of communications for his company one day and suggested that a medal be presented by the company to one of its radio operators at the airport. When asked his reason for making such a recommendation he gave the following explanation:

"I was on my regular run from New York to Chicago and the weather indicated that nothing but favorable flying conditions would be encountered all the way. As I continued along the course, the Chicago operator advised that the Fort Wayne Airport would remain open for another hour and that I should land there. I did as instructed.

After landing I learned that all the

(Continued on page 58)



Out of sight of the ground the pilots depend on weather information transmitted to them by the radiomen on the ground (left). In such a manner they are kept advised of all conditions from their point of takeoff to the area of their final destination.

QUESTIONS and ANSWERS

B. R. D., Wilmette, Illinois: What do I have to do to become an amateur? I understand one must be able to send and receive so many words per minute and also that it is necessary to pass a written examination. I do not, however, know the exact requirements and would appreciate receiving this information.

Answer: Before anyone can operate an amateur transmitting station, he must obtain a station and operating license from the Federal Communications Commission. To obtain the license the applicant must be able to send and receive the International Morse code at the rate of 13 ordinary English words per minute (5 letters to the word). If the applicant passes the code test he is then given a written examination to prove his technical knowledge of the theory and practice of amateur radio communication as well as the laws and regulations affecting amateur licenses. Amateur licenses are issued only to citizens of the United States. The required forms may be obtained from the office of the Federal Communications Commission in the Inspection District where the applicant resides.

* * *

C.D., Rochester, N. Y.: The upper part of the dial on my receiver is marked in kilocycles and megacycles, and the bottom part of the dial in wavelength-meters. Please explain the conversion of these terms.

Answer: Formerly all radio enthusiasts thought in terms of wavelength. Now, however, the trend is definitely toward the use of frequencies rather than wavelengths. Because of this changing situation it is often found necessary to convert frequency listings to terms of wavelengths and vice versa. A common practice is to divide the known unit into 300,000 to determine the unknown unit. Thus if one knows that a certain broadcast station transmits on 300 meters, and wants to find the frequency, he divides 300 into 300,000 and the answer—1000 kc.—is correct to an accuracy of a fraction of one per cent. Or if he knows the frequency of the station and wants to find the wavelength, he simply reverses the process, dividing 1000 into 300,000. It is to be noted that 300,000 represents the speed of radio waves in kilometers per second. This figure is not quite correct, the latest experiments giving 299,760, but 300,000 is used for conversion by international agreement.

E. G., Brooklyn, N. Y.: To settle an argument, please advise if a receiver designed for 110 volt 60 cycle line supply can be used on 25 cycle supply without injury to the power transformer.

Answer: A set made for 60 cycle operation should not be connected to a 25 cycle current power line without replacing the transformer with one especially designed for that frequency and also increasing the capacity of the filter.

G. A. J., Easton, Pa.: Recently I purchased an all-wave set and as I am interested in receiving all the short-wave broadcast programs from my homeland, France, please advise the operating frequencies of the Paris stations and the time of transmission.

Answer: The French stations are three in number: TPA2 may be found on 15,243 kilocycles (wavelength 19.68 meters) from the hours of 6 a. m. to 11 a. m., TPA3 on 11,885 kc. (25.24 meters) from 2 to 5 a. m. and 12 noon to approximately 6 p. m.; station TPA4 transmits on 11,720 kc. (25.60 meters) and this station is on the air from 6 p. m. to 2 a. m., all eastern standard time.

S. R. S., Bangor, Maine: Is it good practice to operate two receivers from the same outside antenna? One is a short-wave set and the other I use for just local broadband reception.

Answer: Yes, it can be done. Connect .002 mfd. condenser at antenna post of each set, and then to same antenna.

C. A. Z., Los Angeles, Cal.: Recently I heard a short-wave station on approximately 10,350 kilocycles. The announcement was made in Spanish and the only part that I was able to get was "Radio National." Can you advise the station call?

Answer: The station you heard is Radio Salamanca, Salamanca, Spain, which transmits on approximately 10,370 kilocycles. Its slogan is "Radio Nacional."

S. K., Toronto, Ontario, Canada: I am about to erect a straight "L" type antenna and my home runs parallel to a surface car line. I believe I am correct in saying that the flat top should be at right angles to the trolley lines so as to minimize interference.

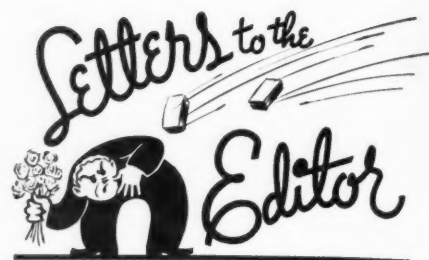
Answer: You are correct, but if your interference is very bad you may find it advisable to put up a special noise reducing antenna system.

W. A. P., Boston, Mass.: Is it necessary to use a lightning arrester with an indoor antenna?

Answer: Usually not, but suggest that you check this with your insurance company, as we do not know the laws for your particular state.

R. R., Evanston, Ill.: I am having difficulty in tuning my radio, the tuning condensers seem to stick or else the trouble is with the control.

Answer: This type of trouble is generally traceable to the control, due to a mechanical defect and it would be best to consult a serviceman.



Congratulations! The April issue of RADIO NEWS hit the newsstands here a half hour ago. It is a natural, combining as it does, the fan material with the technical. You've done a swell job of giving the public an all-around radio publication, peppy and informative.

—Jack F. Tierney,
WCAX, Burlington, Vt.

(For praise from a New Englander, you have to be good! Ed.)

Thank you for sending me an advance copy of RADIO NEWS in its new form. Apparently you are appealing to a wider public than before, and I wish you every success with the new editorial policy.

—E. P. H. James,

Promotion Manager, National Broadcasting Co.

Congratulations on the new and vastly improved magazine. In the merger of technical and popular articles, I think you have a winner that should be of vital interest to readers of both classes.

—David Nowinson,

The Des Moines Register and Tribune, Iowa Broadcasting System.

(We seem to be pleasing some of the people, some of the time! Ed.)

Congratulations on the new makeup and contents of your magazine! I have never seen a publication undergo such complete change between editions as yours did in the March-April metamorphosis.

What do I think of it? Speaking as a radio columnist, ham and listener—here are my five bucks for a two year's subscription! Keep up the good work.

—Ulmer Turner,

Radio Editor, Chicago Herald & Examiner.

I have been a subscriber to RADIO NEWS for over a year. I am interested in technical radio consequently I am not interested in a magazine for B.C.L.'s and I am dissatisfied with the change in the type of articles. Since B.C.L.'s don't know that the magazine has changed, I'm afraid your circulation will decrease. If you want to change your magazine, please wait until my subscription expires.

—Nelson Blachman,
Cleveland Hghts, Ohio.

(RADIO NEWS aims to cover every phase of the gigantic industry. Ed.)

Congratulations on the fine job you and Mr. Davis have done on RADIO NEWS. The improvement is tremendous and I can see the terrific amount of work and creative energy you have both poured into it. The lay-out is splendid and the articles professionally written. There is no suggestion that I could make other than flinging photographs of a few pretty radio gals around. I suppose at first you had to go easy so the frightened readers wouldn't think you had gone "fan" on them.

—Rosa Reilly,
Author, New York City.

I received my copy of the new April issue by mail. So you have gone in for pictures of pretty girls on the front cover, and stuffy gab about radio actors, just like a typical "movie" magazine. . . . I am disappointed in the April issue, that's all.

—Joseph J. Barry,
Newark, N. J.

(We cannot ignore any part of radio, whether actors or technicians. Ed.)

I just had to write. I could not resist after reading "April Issue" to comment on your magazine. "It's great," cannot believe it is the same magazine. After reading it for nineteen years and saving all of them it is so different than all the rest. Some improvement. Sooooo here is best of luck and keep up your good work. Best 73.

—Harry A. Bremer,

Associate I. R. E. President Hudson City Radio Club, Jersey City, N. J.

(Concluded on page 60)

A PORTABLE 28MC TRANSMITTER

by HOWARD BURGESS

When the broadcasters do it, it generally is good. Some new wrinkles in the construction of a 28MC rig. Ideal for that summer trip you were planning.

SPRING is in the air, and the amateur usually has the urge to go places in his car. With the new regulations permitting mobile operation on 10 meters, a good portable transmitter is a joy to take on that vacation. Commercial transmitters are known for their consistency of action and their freedom from "bugs" and trouble. The one described herein was designed for a broadcast station, and should be just the thing for the enterprising amateur.

This particular transmitter was built for a midwestern seed company for broadcast pick-ups direct from the test gardens and for any event of public interest. The same unit with a crystal of proper frequency can be used as a low powered amateur or emergency transmitter. With this in mind it was decided that it must have the following features.

1. It must be a single self-contained unit including batteries and yet must be light in weight and easy to carry.

2. Should be crystal controlled with an output near 30 megacycles and should be modulated one hundred per cent by an audio section with enough gain to work from any kind of microphone and with quality suitable for use for rebroadcast purposes.

3. Standard parts must be used all the way through and also standard tubes. Acorn tubes and special parts can be mighty hard to find sometimes if a breakdown occurs miles from the nearest supply house or in time of an emergency.

The design of the entire transmitter depends on the type of tubes used. There are

many combinations possible but two volt tubes were given preference over the six volt type only because of the smaller filament batteries which could be used.

Starting at the top of the pack is the radio frequency portion consisting of a crystal controlled oscillator doubler, doubler and final amplifier mounted on an aluminum chassis bent 1/6" stock and measuring 4" x 9" x 3".

The R.F. line-up consists of a 19, the first section as a 7.5 megacycle crystal oscillator and the second section as a doubler with its output on 15 megacycles. The second tube is another type 19 with the elements connected in parallel and doubling to 30 mc and drives the third tube, which is another 19 acting as a straight neutralized stage on 30 mc.

The crystal is in the rear left hand corner. In front of the crystal is the first 19, which is the oscillator doubler. By experiment it was found that by using zero bias on the oscillator section, the output was greatly increased and the stability did not seem to be affected. The oscillator tuning condenser is below the chassis under the oscillator tube. The plate condenser of the first doubler is mounted on brackets above the chassis to the right of the oscillator and behind this is the inductance mounted on porcelain lead-through insulators. To the rear of this coil is the second 19. It was found that in this particular case that by hooking the elements in parallel much

The complete transmitter which was the model on which this ham rig was based.

more output could be realized from this tube than any other circuit tried.

Push pull grids, parallel plates were tried and discarded. The plate tune circuit of this tube is mounted below the chassis, the inductance being mounted on small stand-off insulators. At the right end of the chassis is the ten meter final. The plate tuning coil and condenser are mounted above the subpanel and directly below is the neutralizing condenser.

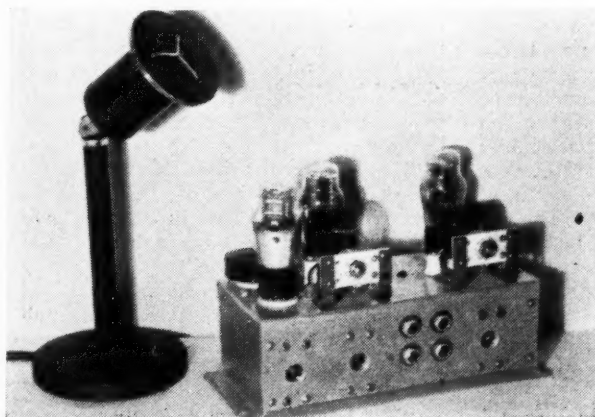
All sockets are small Amphenol statelite which require a mounting space no larger than the base of the tube. All tuning condensers are the National UMC ultra midgets, those mounted below the subbase were bolted directly to the front of the chassis and those above were mounted on small angles made of 1/8" x 1/4" brass. All tuning inductances were made self-supporting of No. 12 enamel wire except the oscillator plate coil, which is wound of No. 28 wire on a 3/4" form. All r.f. chokes and bypasses are hung self-supporting.

Four closed circuit jacks are provided in the front to measure the twenty and ten meter doubler and final plate current and

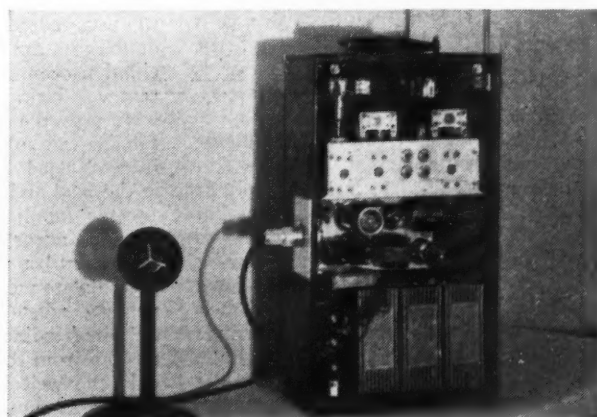
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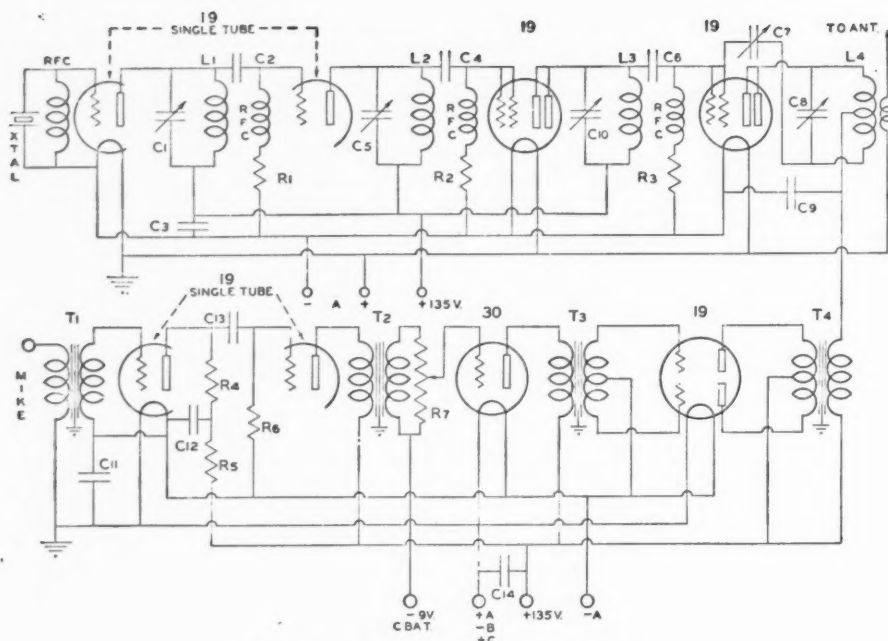


The Radio Frequency section of the miniature transmitter. It is considerably smaller than the "Salt Shaker" mike.



Complete with power supply, the portable rig has an audio frequency response substantially flat to 30-10,000 c.p.s.





Circuit of the portable 28MC transmitter.

C1—.0001 mfd. midget var.	C10—.000035 mfd. midget var.	R5—50,000 ohms 5 w.
C2—.0001 mfd. mica.	C11—.5 mfd. 200v. paper.	R6—.25 megohms 2 w.
C3—.005 mfd. mica.	C12—.5 mfd. 250v. paper.	R7—500,000 ohms pot.
C4—.0001 mfd. mica.	C13—.001 mfd. paper.	T1—Universal Input Transformer.
C5—.000035 mfd. midget var.	C14—.8 mfd. electro.	T2—Single plate—single grid trans.
C6—.0001 mfd. mica.	R1—5000 ohms 1 w.	T3—Single plate—push-pull grids trans.
C7—.000015 mfd. midget var.	R2—5000 ohms 1 w.	T4—19 Cl. B. Output trans.
C8—.000035 mfd. midget var.	R3—2000 ohms 2 w.	RFC—Radio Freq. Chokes.
C9—.0005 mfd. mica.	R4—.25 megohms 5 w.	

also final grid current. All power supply leads are brought out to five terminals on the right end of the chassis.

Below the r.f. section is the audio system, consisting of a 19 speech amplifier, 30 driver and a 19 class B modulator. This is all mounted on an 8" x 4" x 1/2" aluminum chassis. Low impedance input for use with a dynamic microphone is used, the coupling transformer being one of the "Ultra Compacts" made by UTC. This feeds the grid of the 19 speech stage, which uses both sections resistance coupled.

Another UTC compact is used to couple the 19 to the grid of the driver 30, which in turn drives the last 19 as a class B modulator. The speech stage is operated with zero bias except for that provided by returning the grids to the negative side of the filament.

Audio gain is controlled by a potentiometer in the grid of the 30. All battery leads are brought out to a tube socket and the battery cable made plug in. The audio section was checked by an oscilloscope and proved to be relatively flat from 60 to 10,000 c.p.s.

Power is supplied by three portable B batteries and two "Little Six" dry cells and a nine volt C battery. Only one Little Six dry cell can be used if the cover is removed and the cells connected in series-parallel. The batteries fit snug enough in the bottom of the case to prevent jumping around while being carried.

The case is made of 1/4 inch three-ply fir panel board and covered with leather grained auto top fabric which is easier to apply than a good looking coat of paint and looks much more like a professional job. The R.F. portion is mounted at the top of the case, the ends resting shelf fashion on small brackets bolted to the side of the case. Below is the audio section bolted flat to the rear of the case with the tubes

horizontal and below this is the battery supply.

Midway up on the left side of the case are mounted the microphone plug and the gain control and on the right, mounted on lead-throughs, is an eight foot telescoping antenna which acts as a grounded quarter wave Marconi type. The chassis, batteries, microphone line and the capacity of the operator's body to the unit and to ground act as a counterpoise or ground quite well at this high frequency.

After checking the wiring and mounting in the case, tuning up is a straight forward process. Filament and plate voltage are applied to the tubes. The 19's being zero bias tubes, the plate current reads quite low until excitation is applied, so a plate meter is plugged into the twenty meter doubler and the oscillator tuned until maximum output is shown on the meter. The meter is then shifted to the ten meter doubler and the first doubler tuned. The ten meter doubler is then tuned for maximum d.c. grid current in the final.

To neutralize the final, remove the crystal to stop excitation and tune the neutralizing condenser until there is no kick in the plate current at any setting of the ten doubler or final tuning condensers. If oscillation occurs at any spot, the plate current will kick. Checks on the oscilloscope have proved this to be a very simple and reliable way to neutralize. The last doubler is readjusted for maximum grid current in the final and the final tank is then tuned for the familiar dip in current. The antenna is adjusted to resonance by pulling it out until a maximum rise is registered on the plate meter. Proper coupling to the antenna must be determined experimentally by bending the antenna coil nearer or farther from the plate coil.

If the well known rules for any short wave construction are followed no trouble

will be encountered. Precautions should be taken not to apply excessive filament voltage, as tubes of this kind are paralyzed very easily.

In operation this unit gave good account of itself and failure was experienced in only one broadcast when the transmitter was by necessity quite low and several all-steel bodied automobiles parked between it and the receiving location making quite an effective screen. For short haul pick-ups, quality better than the average wire line is possible due to the frequency response of the unit and no induced hum or cross talk sometimes encountered in wire circuits.

With a ham crystal it works quite well as a portable or mobile transmitter for local work and, although no DX was worked, it is possible this small amount of power could get over the back fence under good conditions.

Akron's Station LSO

"THIS is station LSO calling.—Please send the twins, Marilyn and Evelyn Parker, to this office immediately."

Then Miss Isabel Wilson, principal of one of Akron's largest grade schools, laid down the xylophone sticks and turned towards the door of her office.

Two minutes later, from the far end of the building and another floor, two demure little sisters, appeared. The broadcast had summoned them quicker than any messenger could have done.

Thus another use for the new interclassroom radio public address system had been demonstrated.

Marilyn and Evelyn, it developed, were

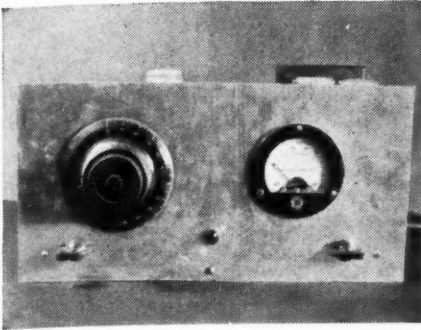


A "program" being sent over "Station LSO." In reality a song-fest being led from a school principal's office.

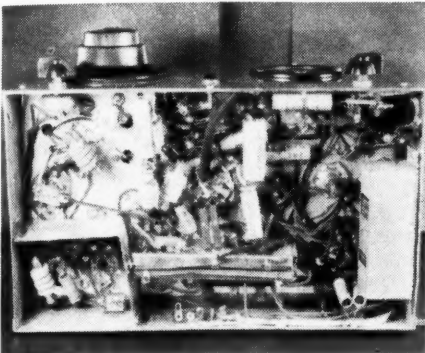
two members of the new radio choir which under the direction of Miss Nellie Whitaker, meets in the principal's office each day, leading youngsters in singing as they sit in their own classrooms all over the building.

In other words, when Miss Whitaker strikes the first notes of "America, the Beautiful," on the piano in the principal's office, down in grade 2, far at the other end of the corridor and two floors up, sleepy little Jack Jones straightens in his seat and looks upward at the speaker in the wall whence issues the voices of the singers.

Then, he too, pipes up and sings in perfect time—with the twins who are many
(Concluded on page 61)



The front of the unit. The dial controls the pitch of the audio note, the meter is used in the Vacuum tube voltmeter.



While it seems complicated, the wiring is extremely simple. Shielding should be followed wherever indicated for best results.

WITH high fidelity audio amplifiers and audio by-pass filtered circuits becoming more and more commonplace, the laboratory of the advanced amateur and serviceman is not complete without an audio oscillator, sometimes termed "Beat Frequency Oscillator." Unfortunately this apparatus is expensive when purchased complete and, therefore, many experimenters and engineers have preferred to work without it.

The working circuit of the Beat Frequency Oscillator is difficult to obtain because it is rarely published and the one herein described resulted from an enforced session with a slide rule and a soldering iron.

It includes a vacuum tube voltmeter brought to its own separate terminal, an innovation which greatly increases the flexibility of making measurements. With a comparatively high output, the unit proved such a good performer that it has busily been going the rounds on loan to other laboratories.

The greatest difficulty to be overcome in the design of beat frequency oscillators is the tendency of the fixed and variable oscillators to interlock when the frequency difference between them is small. This interlocking prevents the production of low audio notes.

In this beat frequency oscillator interlocking is entirely absent. Smooth performance is had right down to zero cycles per second. This smoothness results from the use of electron coupled oscillators, an injector grid mixer tube, and careful shielding and parts placing.

Good output wave form and freedom from harmonics are essential to a precision

A HOME BUILT AUDIO OSCILLATOR

by ERNEST A. ZADIG

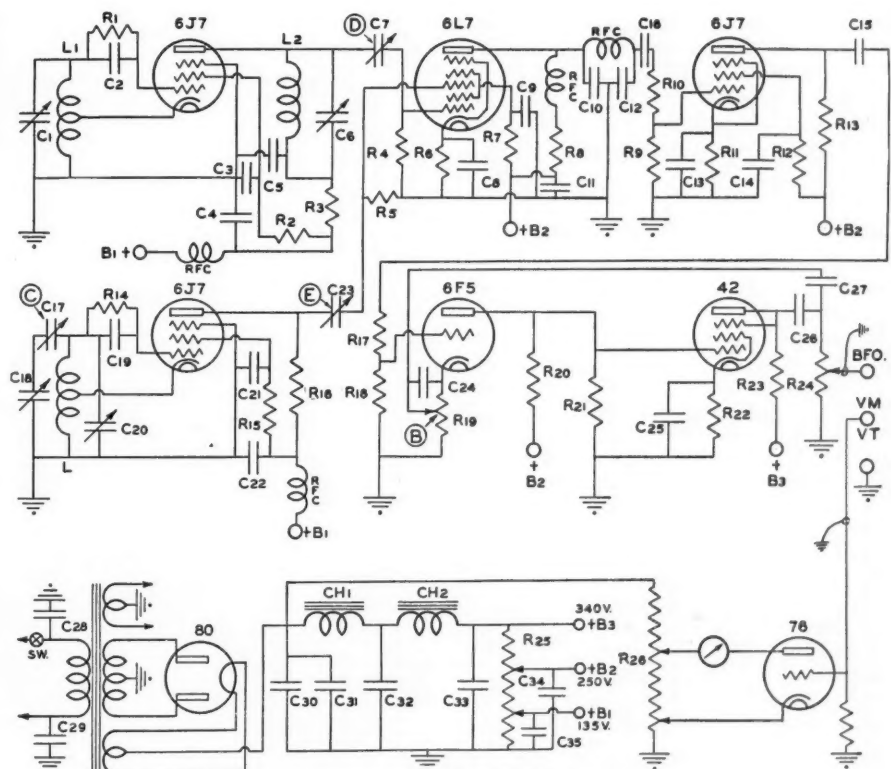
Circuits of audio oscillators are comparatively rare, and the cost of the factory article is high. Radio News takes pride in presenting this circuit which is helpful to amateurs and servicemen.

beat frequency oscillator, and herein also this unit fills the bill. This is achieved by the tuned tank in the plate circuit of the fixed oscillator and by the very small coupling condensers to the grids of the mixer tube.

It is a known fact that when either oscillator of a beat frequency arrangement

is free from harmonics the heterodyne frequency will be free from harmonics. In this case the tuned tank circuit and the small coupling condenser allow only the fundamental frequency to pass to the mixer.

Resistance coupling is used in the am-
(Continued on page 56)



FOR INFORMATION ON (B)(C)(D)(E) SEE TEXT

The circuit of the B.F.O. combination V.T.M.

C₁—Trimmer of IF
C₂—.00025 mfd mica
C₃—.01 mfd 200v paper
C₄—.01 mfd 200v paper
C₅—.01 mfd 200v paper
C₆—Trimmer of IF
C₇—.00001 mfd trimmer
C₈—.01 mfd 350v paper
C₉—.01 mfd 350v paper
C₁₀—.00025 mfd 400v mica
C₁₁—.01 mfd 450v paper
C₁₂—.00025 mfd 400v mica
C₁₃—.5 mfd 450v electro.
C₁₄—.1 mfd 450v paper
C₁₅—.1 mfd 450v mica
C₁₆—.1 mfd 450v paper
C₁₇—.0002 padder air cond.
C₁₈—.35 mmfd var. midjet
C₁₉—.00025 mfd mica
C₂₀—Trimmer of IF
C₂₁—.01 mfd 200v paper
C₂₂—.01 mfd 200v paper
C₂₃—.00001 mfd trimmer

C₂₄—.5 mfd 450v electro.
C₂₅—.5 mfd 450v electro.
C₂₆—.1 mfd 450v paper
C₂₇—.002 mfd mica
C₂₈—.01 mfd mica
C₂₉—.01 mfd mica
C₃₀—.8 mfd 500v electro.
C₃₁—.8 mfd 500v electro.
C₃₂—.8 mfd 500v electro.
C₃₃—.8 mfd 500v electro.
C₃₄—.8 mfd 500v electro.
C₃₅—.8 mfd 500v electro.
C₃₆—.1 mfd 450v paper
R₁—25000 ohms 1 w
R₂—50000 ohms 1 w
R₃—10000 ohms 1 w
R₄—.5 megohm 1 w
R₅—50000 ohms 1 w
R₆—7500 ohms 10 w
R₇—100000 ohms 10 w

R₈—50000 ohms 10 w
R₉—.25 megohm 5 w
R₁₀—100000 ohms 2 w
R₁₁—13000 ohms 10 w
R₁₂—.25 megohm 10 w
R₁₃—100000 ohms 10 w
R₁₄—25000 ohms 1 w
R₁₅—50000 ohms 1 w
R₁₆—10000 ohms 1 w
R₁₇—500000 ohms 5 w
R₁₈—25000 ohms 5 w
R₁₉—10000 ohms 10 w
R₂₀—10000 ohms 10 w
R₂₁—.25 megohm 5 w
R₂₂—1000 ohms 10 w
R₂₃—5000 ohms 10 w
R₂₄—5000 ohms pot.
R₂₅—40000 ohms 25 w adj.
R₂₆—2 megohms 1 w
SW—AC switch

Meter—0-50 Milliammeter with internal shunt removed.
L, L₁, L₂—Rebuilt IF transformers. See text for details.
RFC—Standard broadcast band, radio frequency chokes.

MAGIC-BY RADIO

Magicians are as old as time itself. It is only natural that the modern ones should devise tricks using the radio. The author tells how you may mystify your friends with a few simple "radio effects."

by
DONALD HENDRICKS
President, Society of American
Magicians, Assembly No. 27



FROM a heritage deep in the past pre-biblical days, the urge to do "magic" and be a magician lies deep in every one of us. It is the offshoot of the desire to stand out among our friends, to be one who can do something out of the ordinary.

Do you like card tricks? Or perhaps you can vanish a coin or break and restore a match which has been placed in a handkerchief.

Do you tinker around with your radio set at home? You must have that desire or you would not be reading RADIO NEWS. By combining radio and a few very simple and clever principles of magic you will be able to fool the best of them.

Magicians always call tricks "effects" when addressing a party. If you call them "tricks" you are admitting that they are tricks. By calling them effects you will hint, in a subtle manner that the effect may be mind reading. The effects about to be described have to do with the selection of cards, numbers or words from a book or magazine.

The card is selected while your wife, girl friend or pal is out of the room. The card is returned to the deck and you ask that your friend be brought into the room. You then leave and remain from the room until your friend has selected the chosen card. Mind reading? Nonsense!

Of course, the reason for you leaving the room is to prove to the audience that no signals pass between you and your friend. The truth of the matter is that only by leaving the room are you able to give your friend the desired signal.

Now for the secret. You instruct your assistant to go through the deck, calling out each card. Standing in the next room you listen to her calling the cards out loud. When you hear her name the selected card you wait until she calls two more cards and you then snap the light switch of your room on and off.

This will cause, as you no doubt know, a click in the radio speaker. That's all there is to it, so help me.

But, you say, you don't know what card they will take. True, but you ask that the selected card be shown to everyone in the room. In this manner you will be able to catch a glimpse of the card. If you fail? Well, that is simple, too. You just say, "In all mental effects of this nature it is the practice to inform the magician as to the name of the selected card. In that manner

I will be able to send the medium the correct impression."

Bunk? I should say not. You must know the name of the selected card and you *do* send her the impression.

The next time you have a group of friends in for a game of bridge or to demonstrate the DX of your new set, just try this effect on them. With a little showmanship it will mark you as a mystic. You will be called upon to attend all the parties. You will probably accept the first few invitations, working for the ice cream and cake.

If your time is worth something to you, and if you can entertain with your magic, you should master the remaining effects in this article and charge \$10 for the complete routine. Yes, you can get it. I won't resent



"Ladies and gentlemen, when I hold up the card which you have chosen, the radio will call it out!"

you working in my section of the state. I doubt if any other professional magician will resent it either. A little competition is good for the trade.

Can you tune in the shortwave band on your set? If you can and if the set in the home where you are to present your program can, then you are ready to work one of my most talked about stunts.

First I will give you the general effect. A card is selected by any member of the audience. A number, from a dollar bill, is chosen, then someone selects a color, names a date, etc.

Tuning to the shortwave band on the radio, the audience is astonished to hear something like this, "This is Zelmar, voice of magic, speaking. I see the ace of clubs,

the color red, the number L11839562 A, and the date of April 2, 1938." The voice can end with a "Buh hu ah ha ha he he hee—" You know, a chilling laugh such as the super sleuth on a well known Sunday mystery thriller program uses.

And don't let anyone tell you this won't get you plenty of publicity of the best type,—word of mouth. Everyone who hears of this will want you to give a demonstration.

The secret is simple. You must locate an amateur radio operator. Make friends with him. Get him to give you several test calls and tune in the station on your set. Make sure you can get him in a clean-cut manner. Now on the night of the performance let him know that you will give him a telephone call at about 9 o'clock.

Your assistant at the party will make a list of everything selected. She will then go to the telephone as fast as possible and call the operator, giving him the selections. You now go to the radio and tune in his station. He gives the selections. See? Everything is simple,—if you know how!

Your friends will grab the radio and look for a mike connection. Let them spend half the night in their search, the more they look the less they will see.

That trick alone is worth \$10 of the public's money. I have used it as a publicity stunt for newspapermen. Worked in that manner I use a small shortwave transmitter which is hid in the leather camera case slung about my neck. I have the set turned on while the selections are made. My assistant is located in a store next to the newspaper office. My friend hears the selections being made and telephones them

to a second friend located in a downtown hotel. The managing editor calls the hotel and is surprised to hear each and every selection named to him over the telephone. [A license from the government is required if any transmitting is done by the magician. Of course, if the magician is also a licensed "ham," he is covered.—Ed.]

If you will connect a wire to the aerial post of your set and touch it to a ground connection you will also get a click in the speaker. If you run this wire into a corner, under the rug, and fix it so that by stepping on it you can ground it to a nail which is connected to a water pipe or other ground, (Continued on page 77)

CONSTRUCTION OF A POLARIZED RELAY

by HARRY S. KENYON

Used in automatic circuits and photocell work, this polarized relay will give equal to factory-built service.

THERE is always considerable use for relays in the equipment of experimenters, especially in photo electric cell applications. Relays are not hard to build, but the average home-constructed relay is very insensitive to feeble currents of a milliamper or less.

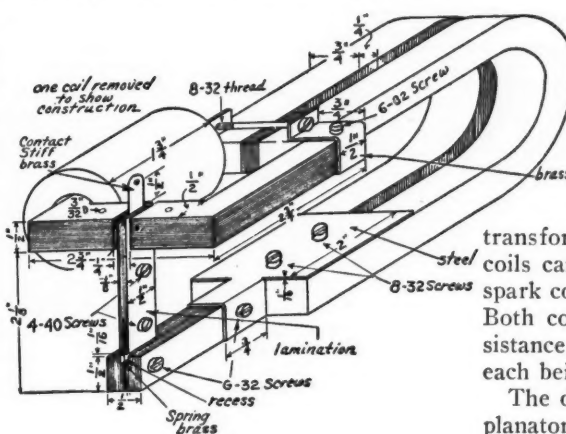
The relay to be described is very sensitive; the one constructed operating well on currents as low as 250 microamperes. In one experiment, it operated on 50 microamperes, although the reliability was poor for this sensitivity. The current controlling capacity however is quite low, when operating at such low currents, due to the small separation of the contacts, so an auxiliary relay drawing an energizing power of not over .25 watt should be used.

Auxiliary relays should always be used when the sensitive relay is operating on currents of a milliamper or under. Those working on up to two watts are satisfactory.

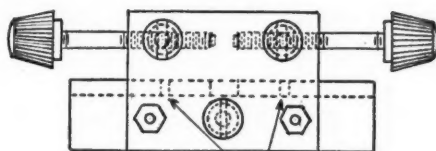
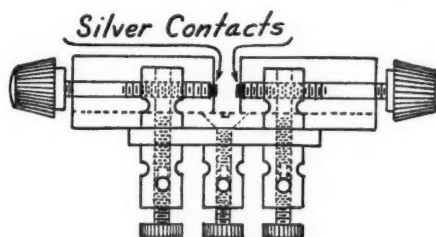
This relay is polarized so as to operate on currents of a certain direction. Single pole, double throw, it can be adjusted to stay closed in one position until direct current reverses direction. It remains on the other contact until again reversed.

This also makes it applicable as a circuit breaker. It can be made to close on a given current in a predetermined direction, and open again as the current is reduced. The current change to open, when the relay is being held closed by the minimum current required to close, can be adjusted within rather wide limits. About 250 microamperes is the minimum, when the closing current is a milliamper or over. It is very useful in "squench" circuits used to reduce, or cut off entirely, the output of radio sets when the signal input reaches a certain predetermined, minimum value.

With no current flowing in the coils the armature is attracted equally to either pole. However, if a current is passed through the coils in the direction shown, the polarity of N_1 will be strengthened, and the polarity of N_2 weakened or even changed to the opposite. This, of course, tends to move the armature toward N_1 . The action is reversed by changing the direction of the current.



The author's drawing clearly shows details.



$\frac{3}{32}$ " holes for bolting to pole pieces

The method of mounting the contact points which are really activates.

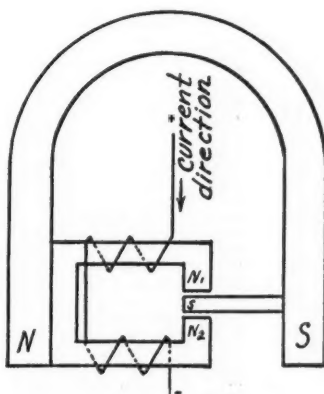


Diagram of how the circuit works.

The parts needed are very easy to obtain. The magnets can be obtained from an old magneto from any motorcycle shop or airport repair station. The poles are made of laminated iron of good permeability. The cores of old audio transformers are especially good. The coils can be obtained from a vibrating spark coil of the model T Ford variety. Both coils in series should have a resistance of about 3,000 to 5,000 ohms, each being half that value.

The drawing is more or less self explanatory. The dimensions, of course, do not have to be followed exactly, but can be changed to fit the material available. If L shaped laminations of the dimensions shown are not available, the laminated spacers between the two permanent magnets can be varied to obtain the same air gap between the pole pieces.

The armature is held to the pole piece at the bottom by a piece of light spring brass. This acts as a hinge. The laminations of the lower pole piece are cut to form the small recess shown so as to obtain more flexibility in the brass spring and still allow the armature to come close to the pole piece and form a good magnetic connection. A strip of brass with contacts attached is clamped between the laminations of the armature. This should be very stiff and have no appreciable bend as the relay operates. The upper pole pieces are held to the magnets by the U-shaped clamps. The lower one is held by the piece of $\frac{1}{16}$ " sheet steel cut and bent as shown in the drawing.

The adjustable contacts are shown in Fig. 2. A piece of nonmagnetic angle such as brass or aluminum is used for the double purpose of a mounting for the contact panel, and to hold the pole pieces in their proper position.

The angle is slotted to allow the armature to move from side to side. The screws used to hold the panel and the ground binding post are countersunk in the angle so as not to interfere with the pole pieces. The mountings for the adjustable contacts are made from binding posts, the horizontal holes being tapped out the size of the contact screw. It is advisable to slot these lengthwise for a short distance and

(Concluded on page 57)



WORLD SHORT WAVE TIME-TABLE

Compiled by the Editors of RADIO NEWS

Hours of transmission for the World's Short Wave Broadcast Stations



HOURS OF TRANSMISSION													EASTERN STANDARD TIME													HOURS OF TRANSMISSION												
8	9	10	11	M	1	2	3	4	5	6	7	Wave-length Meters	Call Letters	Frequency Kc.	City Country	8	9	10	11	N	1	2	3	4	5	6	7											
												13.93	W8XK	21540	Pittsburgh, Pa.																							
												13.93	GSJ	21530	Daventry, England																							
												13.94	W2XE	21520	New York, N. Y.																							
												13.97	GSH	21470	Daventry, England																							
												15.77	HS8PJ	19020	Bangkok, Siam																							
												16.86	GSG	17780	Daventry, England																							
												16.87	W3XAL	17780	Bound Brook, N. J.																							
												16.88	PHI	17770	Huizen, Holland																							
												16.89	W2XE	17760	New York, N. Y.																							
												16.89	DJE	17760	Zeesen, Germany																							
												19.56	DJR	15340	Zeesen, Germany																							
												19.57	W2XAD	15330	Schenectady, N. Y.																							
												19.60	GSP	15310	Daventry, England																							
												19.62	LRO	15290	Buenos Aires, Arg.																							
												19.63	DJO	15280	Zeesen, Germany																							
												19.65	W2XE	15270	New York, N. Y.																							
												19.68	TPA2	15243	Pontoise, France																							
												19.70	OLR5A	15230	Podebrady, Czech.																							
												19.71	PCJ	15220	Huizen, Holland																							
												19.72	W8XK	15210	Pittsburgh, Pa.																							
												19.74	DJB	15200	Zeesen, Germany																							
												19.75	ZBW4	15190	Hong Kong, China																							
												19.76	GSO	15180	Daventry, England																							
												19.79	JZK	15160	Nazaki, Japan																							
												19.82	GSF	15140	Daventry, England																							
												19.84	HVJ	15121	Vatican City																							
												19.85	DJL	15110	Zeesen, Germany																							
												19.88	RKI	12000	Moscow, U.S.S.R.																							
												20.04	LZA	14970	Sofia, Bulgaria																							
												22.16	SPW	13635	Warsaw, Poland																							
												24.52	TFJ	12235	Reykjavik, Iceland																							
												25.00	RV59 (RNE)	15090	Moscow, U.S.S.R.																							
												25.24	TPA3	11885	Pontoise, France																							
												25.27	W8XK	11870	Pittsburgh, Pa.																							
												25.27	OLR4A	11840	Podebrady, Czech.																							
												25.34	W9XAA	11830	Chicago, Ill.																							
												25.36	I2RO4	11810	Rome, Italy																							
												25.40	OER2	11800	Vienna, Austria																							
												25.42	JZJ	11800	Nazaki, Japan																							
												25.45	W1XAL	11790	Boston, Mass.																							
												25.49	DJD	11770	Zeesen, Germany																							
												25.53	GSD	11750	Daventry, England																							
												25.58	CJR4	11730	Winnipeg, Canada																							
												25.60	TPA4	11720	Pontoise, France																							
												25.62	HJ4ABA	11710	Medellin, Colombia																							
												25.63	SBP	11705	Motala, Sweden																							
												25.64	HP5A	11700	Panama, Pana.																							
												26.01	SPD	11535	Warsaw, Poland																							
												26.24	COCX	11435	Havana, Cuba																							
												26.60	HIN	11280	Trujillo, D. R.																							
												27.17	CSW	11040	Lisbon, Portugal																							
												29.04	ORK	10330	Ruyssede, Belgium																							
												29.35	PSH	10220	Rio de Janeiro, Brazil																							
												30.18	CSW	9940	Lisbon, Portugal																							
												30.43	EAQ	9860	Madrid, Spain																							
												31.06	LRX	9660	Buenos Aires, Argentina																							
												31.09	YNLF	9650	Managua, Nicaragua																							
												31.09	CS2AA	9650	Lisbon, Portugal																							
												31.10	HH3W	9645	Port-au-Prince, Haiti																							
												31.14	I2RO3	9635	Rome, Italy																							
												31.25	RAN	9600	Moscow, U.S.S.R.																							
												31.25	HJ1ABP	9600	Cartagena, Colombia																							
												31.27	HLB	9595	Geneva, Switzerland																							
												31.28	VK6ME	9590	Perth, Australia																							
												31.28	W3XAU	9590	Philadelphia, Pa.																							
												31.28	VK2ME	9590	Sydney, Australia																							
												31.28	PCJ	9590	Huizen, Holland																							
												31.28	HP5J	9590	Panama City, Pana.																							
												31.32	GSC	9580	Daventry, England																							
												31.32	VK3LR	9580	Lyndhurst, Australia																							
												31.33	HJ2ABC	9575	Cucuta, Colombia																							
												31.35	W1XK	9570	Millis, Mass.																							
												31.38	DJA	9560	Zeesen, Germany																							
												31.40	TIPG	9559	San Jose, C. R.																							
												31.42	OLR3A	9550	Podebrady, Czech.																							
												31.42	XEFT	9550	Veracruz, Mexico																							
												31.45	DJN	9540	Zeesen, Germany																							
												31.48	W2XAF	9530	Schenectady, N. Y.																							
												31.48	LKJ1	9530	Jeloy, Norway																							
												31.49	ZBW3	9525	Hong Kong, China																							
												31.51	OAX4J	9520	Lima, Peru																							
												31.55	GSB	9510	Daventry, England																							
												31.55	HJU	9510	Buenaventura, Colom.																							
												31.55	VK3ME	9510	Melbourne, Australia																							



WORLD SHORT WAVE TIME-TABLE



Compiled by the Editors of RADIO NEWS
Hours of transmission for the World's Short Wave Broadcast Stations

HOURS OF TRANSMISSION

8	9	10	11	M	1	2	3	4	5	6	7
T	T	T									
Th	Th	Th	Sa	Sa							

LIST OF SYMBOLS

S—Sunday

M—Monday

T—Tuesday

W—Wednesday

Th—Thursday

F—Friday

SA—Saturday

SS—Saturday, Sunday

██████—Daily

☐ —Irregular

—Daily
Except Sunday

 —Daily
 Except Saturday, Sunday

SHORT WAVE FLASHES

BY CHARLES A. MORRISON

EACH month this department will feature flashes from the world of short wave, setting forth the very latest news of DX broadcasts. This is information that has been received after the issue has gone to press. The station reports have been double checked for accuracy.

All frequencies in the column are given in megacycles and all time is Eastern Standard Time.

RADIO NEWS will be interested in hearing from observers reporting any unusual or different DX stations than those which appear here. Be sure to give the time and the frequency as exactly as you can determine.

Special Easter Short-Wave Broadcasts

On Sunday, April 17, 10:45-11 a.m., Easter Sunrise Service at Honolulu, over KKP (16.03), Kahuku, Hawaii, and the NBC-Red network. . . 11:15-11:30 a.m., ringing of bells of basilicas, and the voices of a boys' choir, from Rome, over IRY (16.12), and the NBC-Red network.

Pitcairn—On the Air

The expedition to Pitcairn Island arrived there during a thunder storm on March 1, at 8:20 p.m. (Pitcairn time). After two hours of shuttling back and forth between the steamer and shore in a steady down-pour, they managed to land the 3 tons of radio equipment to be used in establishing a station. Within a few days the transmitter had been set up and a temporary antenna strung up between two trees, at a height of only 18 feet above ground.

On Saturday morning, March 5, shortly after 1 a.m., EST, VR6A (14.346), which was being run on current from two six-volt storage batteries, was turned on, and Lew Bellem, one of the American engineers, called "CQ." Almost immediately W8CNA, owned by F. W. Wolfinger of Binghamton, N. Y., came back, thus gaining the distinction of establishing the first two-way radio contact between the United States and Pitcairn, since the original mutineers from H.M.S. Bounty settled there in 1790. Wolfinger also talked to Andrew Young, a direct descendant of Fletcher Christian, one of the original settlers. Picking up Pitcairn at 1:30 a.m., during this initial contact, Harry Kentzel of Averill Park, N. Y., became the first short-wave listener to report reception from this island. Since that date many listeners have heard VR6A at various times between 11:30 p.m. and 6 a.m.

Since only 1500 VR6A QSL cards were taken along by the expedition, it will be a question of "first come—first served!" Reports, which must enclose an International Reply Coupon, can be sent to VR6A, Pitcairn Island, or to the Coto Coil Co., 229 Chapman St., Providence, R. I. (whose en-

gineers are responsible for setting up the station). Several programs from Pitcairn, the first of which was broadcast on March 15, have been rebroadcast over NBC networks. For these commercial contacts, VR6A usually utilizes a frequency of 15.32 mc.'s, while KKW (13.78) is the Bolinas, Calif., end of the circuit.

New Short-Wave Stations

(On the Air)

Germany—DJS (21.45), now transmitting the German program to Asia, daily 12:05 to 11 a.m. . . *Czechoslovakia*—OK1MPT (5.145), an experimental transmitter at Prague, testing Wednesdays and Saturdays, 5:15 to 5:30 p.m. . . *India*—A 10 kw. transmitter of "All-India Radio," call believed to be VUB, inaugurated at Bombay on February 4, now broadcasting daily on 6.085, or 3.303 mc.'s. . . *Cuba*—COX4S (6.396), operated by Signal Corps of Cuban Army, Marianad, broadcasts irregularly for schools, using calls COX1—COX2—COX3—COX6 and COX4S; COCB (6.19), heard testing and relaying programs of CMCB, Havana, Cuba, irregularly to 11 p.m. Announcements were in Spanish and English. . . A 15/22 kw. Cuban Army transmitter has been testing on approximately 6 mc.'s.

(Under Construction)

Turkey—TAQ (15.195), at Ankara, will come on the air some time during 1938. . . *Argentina*—Two new short-wave transmitters which will be used to relay broadcast stations LR3 and LS8, respectively. . . *Mexico D. F.*—A 1500-watt transmitter to relay programs of the Universidad Nacional de Mexico will soon take the air on a frequency of 9.58 mc.'s. Call may be XEYU. . . *Egypt*—A short-wave station for the Egyptian State Telegraphs and Telephone Administration, to relay radio programs to the Sudan.

Notes of Interest

Cuba—Off the air for some time while its transmitter was being remodeled, COCX of Havana is now broadcasting again on various frequencies in the vicinity of 11.42 mc.'s. . . *Canada*—VE9CA (6.03), Calgary, signs off at 2 a.m. with selection "Lights Out" . . . *Colombia*—HJ3ABX (6.013), relaying HJ3ABZ of Bogota, signs off with selection "Indian Love Call" . . . *Peru*—OAX4J (9.34), which relays OAX4I of Lima, daily noon to midnight, signs off with the selection "The Whistler and His Dog". . . *Czechoslovakia*—OLR of Prague has several different scenic verification cards for short-wave listeners who send in regular reports. . . *Ethiopia*—IUD (18.27), Addis Ababa calls "Radio Coltano," Italy, almost daily at 8 a.m. . . *Portuguese East Africa*—CR7BH (11.718) of Laurence Marques, Mozambique, is being heard afternoons between 3 and 4 p.m. by listeners in

the Eastern and Central states of the United States. . . *Mexico*—XETA (11.76), "El Pregonero del Norte," Edificio Reyes, Monterrey, N. L., is on the air again daily from noon to 3:30 p.m. and irregularly in the evenings. . . *Greenland*—The *McGregor Expedition* at Reindeer Point is using its commercial call W10XAB for transmissions on its amateur 14.368 mc.'s, use of the amateur call OX2QY having been banned by the Danish Government. . . *England*—On March 14, Daventry inaugurated news bulletins for listeners in Central and South America. These are being radiated daily over GSB (9.51), in Spanish at 8:30 p.m. and in Portuguese at 8:45 p.m. . . *Costa Rica*—On May 4, 1938, TI4NRH, "The Voice of Costa Rica," Heredia, one of the world's first short-wave stations, will celebrate its tenth anniversary on the air with a gala program dedicated to various short-wave clubs. Listeners reporting on this, or one of the other special broadcasts during May, will receive a three-color (14x18") diploma, suitable for framing. Reports must enclose an International Reply Coupon or a dime, preferably the later. . . *Italy*—IQY (11.9) has ceased to relay the "American Hour" from Rome heard daily from 7:30 to 9 p.m., over 2RO3 (9.635) and IRF (9.83). . . *Java*—YDC (15.15), Bandoeng, is now being heard daily except Saturdays and Sundays from 6 to 7:30 p.m. Program opens with exercises. At 6:30 p.m. (EST) a clock can be heard striking 7 a.m. (Java time.) . . *Mexico*—According to Alfonso Velasco of Mexico D. F., "Radio del Pueblo" (7.1), an unlicensed station at Guadalajara, Mexico, has closed down.

Transmissions of Interest

El Salvador—English lessons over YSD (7.894), San Salvador, Wednesdays 7 to 7:20 p.m. . . *Hawaii*—"Hawaii Calls" program, over KKP (16.03) of Kahuku, Sundays at 9 p.m. . . *French Somaliland*—Test broadcasts from FZE8 (17.28), Djibouti, the first Thursday in each month, 8 to 8:30 a.m. . . *Fiji Islands*—English news-cast from VPD2 (9.54), Suva, daily at 5:45 a.m. . . *Colombia*—DX broadcasts from HJ1ABE (4.8), Cartagena, Mondays at 10 p.m. English programs over HJ4ABU (8.65), Medellin, Mondays 9 to 10 p.m. . . *Czechoslovakia*—North American transmissions from Prague, over OLR3A (9.55), Mondays, Tuesdays, Thursdays and Fridays from 8 to 10 p.m. (sometimes to 10:35 p.m.). Later these programs will probably be radiated to OLR4A (11.84). . . *Spain*—Loyalist transmissions for North America, over EAR (9.488) of Madrid, daily 7:30 to 8 p.m. and 8:40 to 9 p.m. . . *Australia*—News brevities from VLR (9.58), Melbourne, weekdays at 8:20 a.m. and on Sundays at 7:15 a.m. . . *France*—Radio plays in Esperanto, over TPA3 (11.885), Pontoise, Mondays 5:45 to 6 p.m. . . *Martinique Island*—English broadcasts from "Radio Martinique" (9.685), Fort-de-France, Mondays and Wednesdays 6:30 to 7 p.m.

Revised Schedules

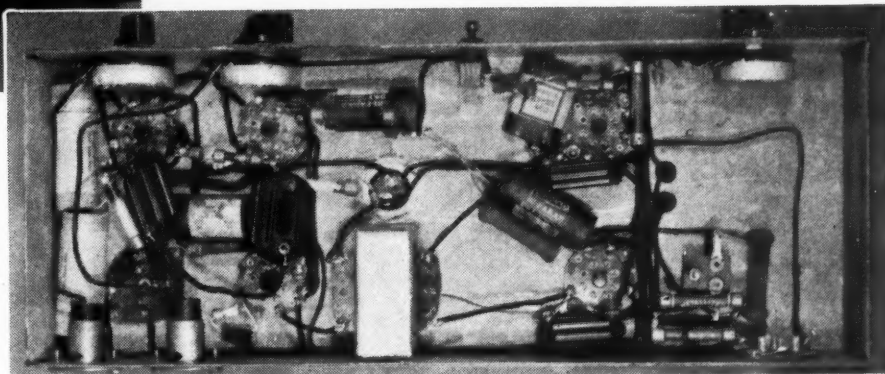
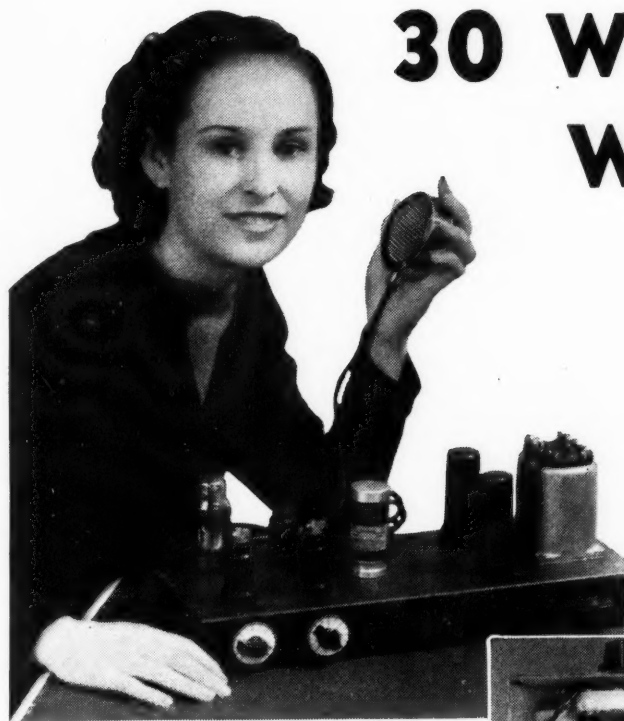
Japan—Daily overseas broadcasts for the Pacific Coast of North America, 12:30 to (Continued on page 70)

30 WATTS OF AUDIO WITH A. V. L.

by GUY FORREST

Stricter monitoring by the Government and wider range in use of amplifiers, indicate the employment of an automatic volume limiter described by the author in the "ham" rig, or the P.A. system.

Compact in every respect, the amplifier can be used to full power without fear of distortion.



The underside shows that extreme care has been used in isolating each section of the amplifier.

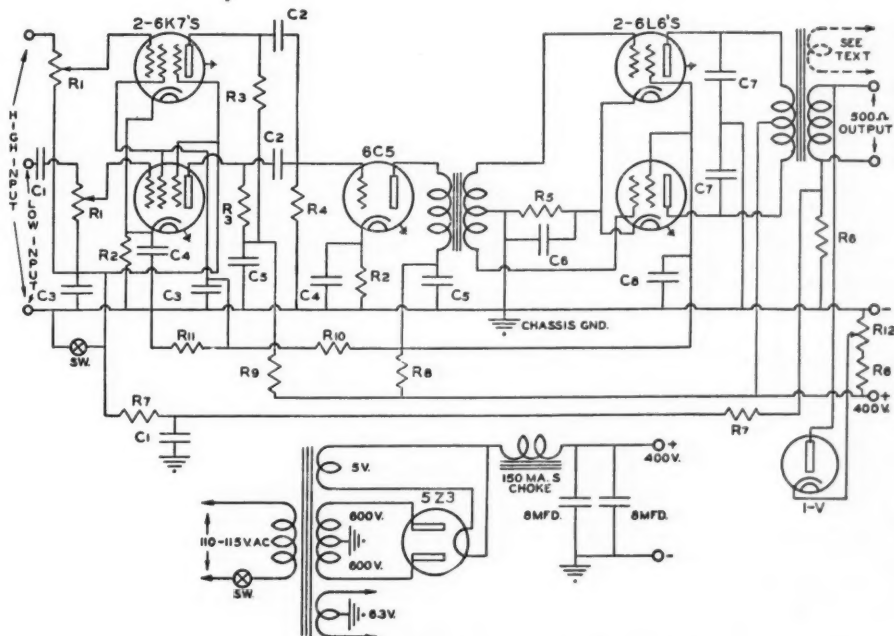
THE compact 6-tube power amplifier described in this article includes several features and new advancements to recommend it to the sound engineer, serviceman and radio amateur. Two 6L6 type tubes are employed in a push-pull AB1 circuit to provide 30 watts power output. It is designed with individual input circuits for two microphones, separate controls are provided for mixing and blending the input sources to any desired degree, and an automatic-volume-limiting circuit, a development which is bound to create unusual interest in the entire radio field.

In public address systems and radiotelephone modulators it is essential that the volume level never rise above certain limits. For sound reproduction this maximum level is set by overload distortion in one or more parts of the equipment, or by other considerations. In radiotelephony the maximum allowable level is set at 100% modulation. If the 100% mark is consistently reached, the best possible signal is put through, but without the distortion or spluttering which accompanies overmodulation.

Ordinarily, monitoring, and adjustment of program or speech level, is done manually, the operator being guided either by volume indicators or modulation meters. However, in common with most systems which involve a human element, the control cannot be perfect. Some leeway must be kept to allow for sudden peaks, and other peaks will rise too high before control is, or can be, regained. The automatic volume limiter—or AVL—described here is just that, rather than an automatic volume control. It makes possible a higher average program level without danger of overshooting.

The device exercises no action below a given output, but smoothly and without distortion limits any level which tries to

(Continued on page 61)



The circuit of the AVL 30-watt audio amplifier.

C₁—.25 mfd 200v paper
C₂—.005 mfd 600v mica
C₃—1. mfd 200v paper
C₄—20 mfd 25v electro.
C₅—8.8 mfd 450v elect.
C₆—20 mfd 50v electro.
C₇—.002 mfd 600v mica

C₈—.5 mfd 450v paper
R₁—.5 megohm pot.
R₂—1000 ohm 1 w
R₃—.5 megohm 1/2 w
R₄—1 megohm 1/2 w
R₅—200 ohms 5 w
SW—AC switch

R₆—.25 megohm 1 w
R₇—.25 megohm 1/2 w
R₈—5000 ohms 5 w
R₉—50000 ohms 1 w
R₁₀—75000 ohms 1 w
R₁₁—4000 ohms 1 w
R₁₂—.25 megohm pot.

AN A.V.E. NOISE SILENCER UNIT

by McMURDO SILVER

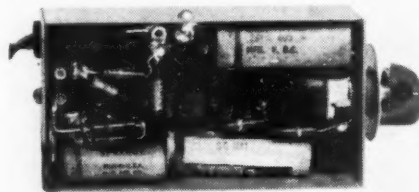
Chief Engineer, McMurdo Silver Corp., Chicago

Much of the beauty of classical music is lost in its broadcast. The author's unit restores the variations in volume with this automatic volume expander. The amateur will find use for it as a noise silencer, and static reception reducer.

THERE is hardly a radio listener who does not know that broadcast and recorded classical and symphonic music is shorn of much of its emotional appeal before it is transmitted to his receiver. He knows this is so because broadcast transmitters and phonograph recordings cannot handle over an average of 50 db. loud-to-soft volume range without introducing overload on loud passages and noise on soft passages. So when a symphonic composition is "compressed" from the 70 to 80 db. volume range its composer wrote into it, to be squeezed through a 50 db. "pipe," what comes out leaves much indeed to be desired.

Conventional volume expanders capable of re-expanding compressed symphonic music to substantial naturalness have been so delicate and complicated that they had to be built as an integral part of an audio system. Besides being expensive, and extremely critical of the signal volume level at which it would expand, the typical expander utilizing a 6L7 tube with gain varied by signal-provided voltage applied to an auxiliary grid has been most "touchy" indeed of tubes which it could use without introducing serious distortion of its own into reproduced music. 6L7 tubes are not uniform enough to allow a replacement to be casually inserted into an expander socket.

Usually the best of half a dozen tubes tested would still leave something to be desired. The limitation of signal voltage range over which this conventional type of expander would work—usually it had to be



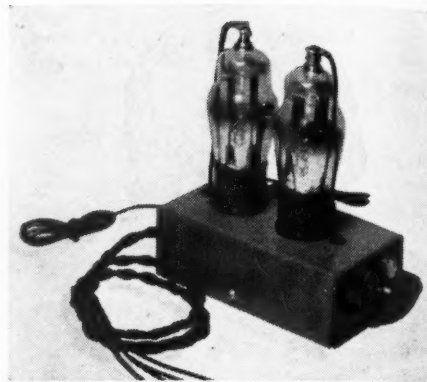
Everything except the tubes is below chassis

set between 1 and 2 volts—completely eliminated it as an accessory. This is a fundamental limitation, it seems, of expanders operating through gain variation.

A volume expander fundamentally is a means of varying amplification so that soft passages can be softened and loud passages loudened—thus reversing the broadcast transmitter or recording studio monitoring operator's function. He cuts gain to soften loud passages and raises gain to louden soft passages—and so destroys quite completely the emotional message conveyed in symphonic and classical music through its volume variation.

The simplest volume expander is one hand on the volume knob—except that the average listener cannot follow symphonic music to control gain in the right amounts and places. So what is needed is an automatic "reversed-a.v.c.," operating in the audio amplifier.

For many months the author had been attempting to devise an expander system which at one and the same time would be non-critical of tubes even when not built



Compact and fool-proof, the AVE unit is a welcome addition to any good radio.

into a specially designed audio amplifier. It also had to be one which would allow latitude in the range of signal input voltage at which it would function without introducing distortion. The unit pictured and diagrammed herewith is the result.

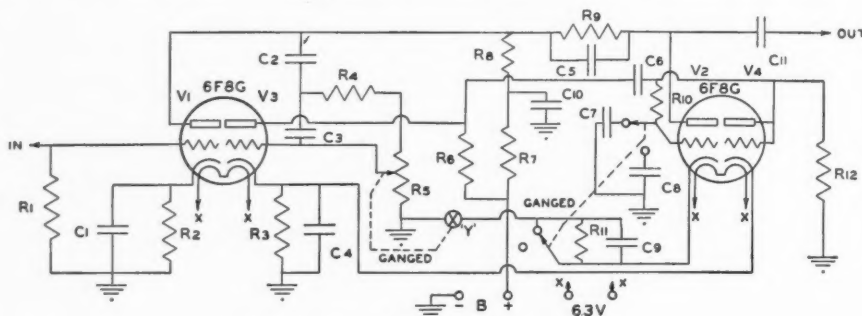
Using but two tubes, it will increase the straight audio voltage amplification of any receiver with which it is used 13 db. It will provide from 23 to 35 db. of automatic dynamic volume expansion at signal voltage levels between $\frac{1}{2}$ and 4 volts entirely without distortion. Possessed of such flexibility, it can be added to almost any existing radio receiver having at least a detector and one audio stage, and will give as good or better results than the costly and delicate expanders found in the most expensive receivers. Yet it can be built in a few hours from standard parts costing less than \$12.00.

The new volume expander consists of two 6F8 tubes (each two 6J5's in one envelope), a one megohm potentiometer to control the degree of expansion ten $\frac{1}{2}$ watt resistors and 9 fixed condensers—mighty little indeed for what it will give to any radio. The first section of one 6F8, V1, acts as a straight resistance coupled audio amplifier either to increase receiver volume when the expander is not in use, or to pick up some of the average signal volume loss which occurs when the expander is used. Its circuit is purely conventional except for the 300,000 ohm resistor between its plate and output coupling condenser.

This resistor is shunted by a 500 mmfd condenser to hold up treble response. The resistor, in series with the plate resistance of V2, one triode section of the second 6F8, forms a volume control potentiometer. From the "arm," or joint of the two resistances making it up, is fed the signal to the following stage.

Triode V2 has a definite plate to cathode resistance, and by causing the signal to vary this tube resistance, we in effect turn the volume control up or down automatically. This is done by taking the signal appearing at the plate of V1 and feeding it to V3 for further amplification, when it is applied to V4 connected as a diode rectifier. In order to cause the reverse a.v.c. or volume expansion action so obtained to vary, not at audio frequency, but at the slower rate at which volume varies in music, the rectified d.c. taken from rectifier V4 is filtered by the $\frac{1}{2}$ mfd. condenser and $\frac{1}{2}$ megohm re-

(Continued on page 55)



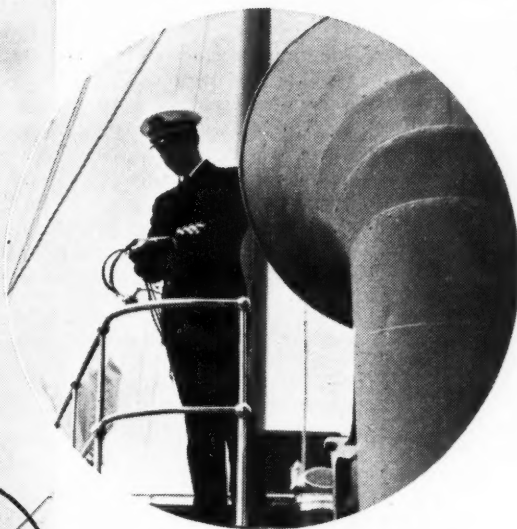
The Circuit of the AVE-Noise Silencer

C₁—5 mfd. 50v. electro.
C₂—1 mfd. 450v. paper
C₃—0.001 mfd. paper
C₄—25 mfd. 50v. electr.
C₅—0.005 mfd. paper
C₆—1 mfd. 450v. paper
C₇—5 mfd. 50v. paper
C₈—0.002 mfd. mica

C₉—25 mfd. 250v. paper
C₁₀—1 mfd. 450v. paper
C₁₁—1 mfd. 450v. paper
R₁—1 megohm $\frac{1}{2}$ w.
R₂—2500 ohms $\frac{1}{2}$ w.
R₃—5000 ohms $\frac{1}{2}$ w.
R₄—3 megohms $\frac{1}{2}$ w.
R₅—1 megohm pot.

R₆—30000 ohms $\frac{1}{2}$ w.
R₇—15000 ohms $\frac{1}{2}$ w.
R₈—30000 ohms $\frac{1}{2}$ w.
R₉—3 megohms $\frac{1}{2}$ w.
R₁₀—5 megohms $\frac{1}{2}$ w.
R₁₁—2000 ohms 2 w.
R₁₂—100000 ohms $\frac{1}{2}$ w.
Y—Switch on pot.

DUO-TONE FOG HORNS & RADIO SAVE SHIPS



Standing on the bridge, the Captain listens for the fog horns (inset). Noting the time difference between them and the simultaneously sent radio signal, he computes position.

WHEE-EEE, whoo-ooo! Whee-eee, who-ooo!

That weird sound, booming mysteriously through the fog, will be a reassuring one to skippers of coastwise ships passing danger zones along the western coast. It will mean that radio, teamed with blasts of sound emitted at definite intervals, is on the job to protect them. And thanks to an ingenious method of synchronization, the ship's exact position now may be very accurately read *without* the use of radio compass bearings. Only a headset and a watch are required.

Every three minutes during the first quarter of each hour, the two-toned horn bellows forth its warning—first in a high-pitched, penetrating scream, then a deep, low-toned boom. At the instant the diaphone emits this ghostly warning, a signal is flashed from a radio transmitter at the same location. By listening in the headset for this signal, and counting the seconds until the slower sound wave reaches the ship across the water, a navigating officer can read his distance directly from a simple calculation. Since sound travels about 1,080 feet per second, the time in seconds can be reduced to nautical miles by dividing by 5.5.

All along the Pacific coast these diaphones are being installed to safeguard coastwise shipping. Operated by compressed air, each has a normal range of fifty-six miles. Dead spots which have caused more than one marine collision when foghorns became mysteriously inaudible, will be reduced or eliminated, for tests have shown that often one pitch of sound will penetrate a "shadow" zone or blind spot where another will not. The same principle is being used in a new type of

lighted gong buoy being placed by the U. S. Lighthouse Service along both coasts. Weighing seventeen tons, it has four separate-toned gongs, which, motivated by wave or swell action, will alternate in long-range warning to mariners.

Giant searchlights are further robbing ocean danger zones of their terrors. At Point Arguello, the "Graveyard of the Pacific," whose sharp reefs are strewn with the bones of many ships, has just been installed a huge beacon whose 1,200,000 candlepower light penetrates a distance of thirty-six miles. In combination with a naval radio compass station, foghorns, and a radio beacon, it will help to convert the hazardous north Pacific passage into a safe, well-lighted lane for navigators.

—50—

**Coming in
JUNE ISSUE I**

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TECHNICAL BOOK & BULLETIN REVIEW

Fundamentals of Radio, by Frederick E. Terman with the collaboration of Lt. F. W. MacDonald, U.S.N., 458 Pages, Price \$3.75, Size 6 by 9 inches, Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. Presents the basic principles of radio communication in a form suitable for use in an introductory radio course. Contains a complete treatment on the subject of vacuum tubes and there are chapters devoted to circuit elements, radio transmitters and television.

Inventions and Their Protections, by George V. Woodling, 316 Pages, Price \$5.00, Published by Penton Publishing Co., 1213 West Third St., Cleveland, Ohio. A new book for electrical and mechanical engineers, designers and others concerned with inventions and patents. The author presents the administration of patent law and information on how to write a patent specification to prepare amendments, etc.

Physics for Technical Students in Colleges and Universities, by William Ballentyne Anderson, Third Edition, 807 Pages, Price \$4.00, Size 6 by 9 inches, Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. A textbook prepared especially for the technical student. The book is divided in 5 parts, 30 chapters with sections on mechanics, properties of matter, heat, sound, electricity and magnetism.

Raytheon's Tube Data Book, 200 Pages, Price 25 cents, Size 4½ by 9 inches, Published by Raytheon Production Corp., 445 Lake Shore Dr., Chicago, Ill. An extremely helpful manual for design engineers, dealers, servicemen and the general radio industry. It contains technical data on all receiving tubes and includes applications, operating curves and the necessary data on resistor, special tubes and panel lamps.

Technical News Bulletin of the National Bureau of Standards No. 250, February 1938, U. S. Department of Commerce. 11 Pages, Size 5½ by 9 inches, U. S. Government Printing Office. Featured contents: Navy radio meteorograph system, Radiometric measurements of ultraviolet solar intensities in the stratosphere, Superconductors at radio frequencies and other subjects.

Allied Radio Corporation, 833 W. Jackson Boulevard, Chicago, Ill. Announces the new 1938 Spring and Summer catalog, containing 164 pages on the latest "Knight" receivers, service equipment, replacement parts, amateur equipment and numerous parts. Free to all readers.

Centralab, Milwaukee, Wis., New 8 page engineering folder on fixed resistors. Shows how typical values and types of resistors react to actual operating conditions, presented with curves and technical data. Available to engineers.

Chicago Wheel and Manufacturing Co., 1101 W. Monroe St., Chicago, Ill. A 32 page catalog describing their latest deluxe "Handee" grinder also a new Hi-Power unit. The parts include a new right angle head for working in

close quarters. Free copies.

Jensen Radio Manufacturing Co., 6601 So. Laramie Ave., Chicago, Ill. A new bulletin on Jensen Peri-Dynamic reproducers showing different models for every installation need. Includes specifications and helpful data. For sound engineers and servicemen.

Lenz Electric Manufacturing Co., 1751 N. Western Ave., Chicago, Ill. Catalog No. 24 describes and illustrates the various types of wire and cable that this company manufactures with particular attention to all kinds of hook-up wire, transmission cable, etc.

P. R. Mallory & Co., Inc., Indianapolis, Ind. A special folder on capacitors for a.c. motor starting. Alphabetical listings of 160 replacements by motor make and model number. Free to servicemen and others interested in this field.

J. W. Miller Co., 5917 So. Main St., Los Angeles, Cal. Six page folder on the new Band-Pass T. R. F. True-Fidelity kits. Includes assembly details and circuit diagrams. Free to readers.

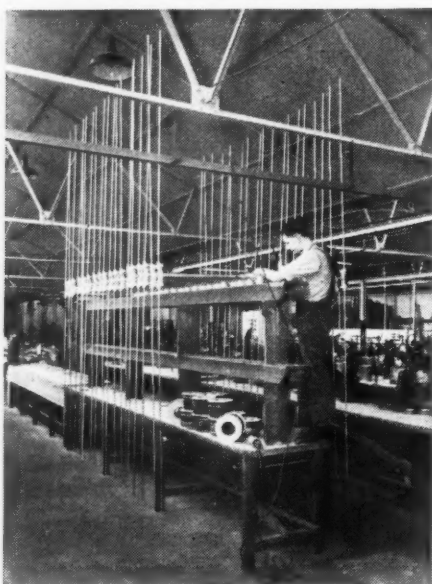
The Radiart Corporation, Cleveland, Ohio. A highly illustrative catalog on the complete line of Radiart motor car antennas. Contains interesting facts on aerials, and drawing layout on installations. For dealers and jobbers.

Shure Brothers, 225 West Huron St., Chicago, Ill. Large size folder describing their crystal and carbon microphones, acoustic devices and phono pickups.

Wholesale Radio Service Company, 100 Sixth Ave., New York City. Just brought out their Spring and Summer catalog, No. 71, which features a complete line of P.A. equipment, 1938 Lafayette receivers and a new camera section listing the latest type cameras and photographic accessories. Copies free to all readers.

Wright-DeCoster, Inc., St. Paul, Minn. Announces a new bulletin A17 entitled Proper Methods on Connecting Extra Speakers. Free to servicemen.

TELEVISION ANTENNAS



In England where television is already on fixed commercial scale, the demand for receiving antennas has caused tremendous increase in production. The workman above is putting the final touches on special television antennas.

SPECIAL BROADCAST PROGRAMS FOR THE DX FAN

LISTED below are the special DX broadcast programs dedicated to RADIO NEWS. Tune in on these special broadcasts and do not fail to send in your report to the station. Give them complete information, reporting the station's signal strength, quality, fading, etc. Practically all of the stations listed will be pleased to verify reports. The schedule is shown in *Eastern Standard Time* and all hours are A.M. unless otherwise indicated.

RADIO NEWS invites all DX clubs and all those having to do with special programs, DX tips and frequency checks to send in the information and help make these schedules as complete as possible. Anyone submitting such information please bear in mind that RADIO NEWS goes to press thirty days before it makes its appearance on the newsstands which means that notice of programs for a given month should be in our hands by the first of the preceding month.

APRIL

Day	Hour	Call	State	Kc.	Kw.
12	4:05-4:20	WCLE	Ohio	610	.5
12	6:10-6:25	KOOS	Ore.	1200	.1
14	4:30-4:45	WFOR	Miss.	1370	.1
24	2:00-4:00	WJBO	La.	1120	.5

MAY

1	2:00-4:00	WJBO	La.	1120	.5
1	4:00-4:30	WPAY	Ohio	1370	.1
8	3:30-3:50	WRAK	Pa.	1370	.1
10	6:10-6:25	KOOS	Ore.	1200	.1
12	4:30-4:45	WFOR	Miss.	1370	.1
22	2:00-4:00	WJBO	La.	1120	.5
22	3:00-4:00	KWYO	Wyo.	1370	.1

PERIODIC PROGRAMS

Dedicated to the DX Clubs and RADIO NEWS

Mondays—

9:15-9:30 p.m., 690 kc., CJCJ, Calgary, Alta., Canada, .1 kw. (tips).

Wednesdays—

12:30 a.m., 1390 kc., KOY, Phoenix, Ariz., 1 kw. (tips).

1:45-2:00 p.m., 780 kc., WTAR, Norfolk, Va., 1 kw. (URDXC) (tips).

Saturdays—

10:30 a.m., 830 kc., WEEU, Reading, Pa., 1 kw. (tips).

Sundays—

12:45-1:00 a.m., 1280 kc., KLS, Oakland, Calif., .25 kw. (URDXC) (tips).

2:45-3:00 a.m., 1010 kc., CKWX, Vancouver, B. C., Canada, .1 kw.

3:00-3:30 a.m., 1410 kc., CKMO, Vancouver, B. C., Canada, .1 kw.

3:30-3:45 a.m., 570 kc., KMTR, Los Angeles, Calif., 1 kw. (tips).

Monthly—

1st day of each month, 3:00-4:00 a.m., 1260 kc., WTOG, Savannah, Ga., 1 kw.

1st Sunday of each month, 4:00-4:30 a.m., 1340 kc., KGDY, Huron, S. Dak., .25 kw.

2nd Monday of each month, 5:20-5:40 a.m., 1250 kc., WAIR, Winston-Salem, N. C., .1 kw.

2nd Tuesday of each month, 5:00-5:30 a.m., 1370 kc., KRMC, Jamestown, N. Dak., 1 kw. 5:00-5:20 a.m., 1210 kc., WSAY, Rochester, N. Y., .1 kw. (NNRC)

2nd Wednesday of each month, 3:40-4:00 a.m., 1310 kc., KAND, Corsicana, Texas., .1 kw. (NNRC).

2nd Thursday of each month, 4:00-4:20 a.m., 1330 kc., KRIS, Corpus Christi, Texas., .5 kw. (NNRC).

2nd Friday of each month, 4:00-4:20 a.m., 1370 kc., WBTM, Danville, Va., .1 kw.

NOTES FROM DX CLUBS

A National Radio Club—Special Notice—was recently received from Harry Gordon that the FCC checks for WLEU, Erie, Pa., 1420 kc., were changed from Thursday to 3:20 to 3:35 a.m. on Fridays. He suggests that it would be a good idea to watch all the FCC checks, he looks for a complete new schedule.

The Chicago Radio DX Corner sends in the following report: WSGN, Birmingham, Ala., 1310 kc., .1 kw., Tests for monitoring, first Saturday of month, 2:15 to 2:30 a.m. . . . K TEN, Temple, Texas, 1370 kc., .25 kw., Tests for Comm. Radio Equipment Co., of Kansas City, Mo., First Saturday of month from 3:00 to 3:30 a.m. . . . LR3, Buenos Aires, Arg., 950 kc., on every Sunday a.m. from 12:30 to 1:45 a.m., all E. S. T.

Depending on good weather conditions, the Newark News Radio Club reports good reception on the following Europeans: Stuttgart, Germany 574 kc., Lyons La Dou, France, 648 kc., Paris 695 kc., Marseilles, France, 749 kc., Leipzig, Germany, 785 kc., Post Parisien, 959 kc., Rennes, France, 1040 kc. Bordeaux, France, 1077 kc., Nice 1185 kc., and Eiffel Tower, France, 1495 kc.

ANSWERS TO "GUESS WHO" ON PAGE 27

- 1—A mad foreigner—Cantor's Mad Russian, Bert Gordon.
- 2—Married to a blonde menace—Jeanette MacDonald, (Mrs. Gene Raymond).
- 3—Ten years of failure didn't stop—Jim and Marian Jordan (Fibber McGee & Molly).
- 4—The broadcast finished—Edgar Bergen puts Charlie McCarthy in his car.
- 5—The lowest pressure salesman—Al (I hope, I hope, I hope) Pierce.
- 6—The famous (?) violinist—Jack (Buck) Benny and his Maxwell.
- 7—A diminutive personality—Little Jackie Heller, a fine tenor singer.

"SIGNAL SQUISHER"

By ALLEN D. RICKERT, JR., W3EQX

Rebelling against the usual dimensions of the average signal squirter, the author investigated and found this compact rig would do a fine job. It uses a director.

ANY amateur working the 14 or 28 MC. bands has the hopes of some day erecting a beam array, but keeps putting it off because, either he lacks space or else he feels too great an expense is incurred in this dyed-in-the-wool sport of directing our signals into the exact spot we desire.

After much thought and due deliberation I decided to try to fold the ordinary flat-top di-pole antenna. I felt there was no reason why this folded doublet should not radiate as well as the conventional type of flat-top. This simple di-pole, though folded, will radiate in the conventional directive manner; that is, it will radiate to its broad-sides.

However, I was after more than just directivity. I was determined to put every last micro-ampere of signal into just one direction. The addition of either a director or reflector was indicated. This means that a parasitic antenna be placed approximately one-tenth wavelength behind the radiating antenna. Theoretically, this parasitic antenna should be placed one-quarter wavelength distant, but when tried the results were very disappointing. So by experiment one-eighth wave was tried, with startling results. By further experiment, to make the array as compact as possible, the distance was cut to one-tenth wave with little or no difference in results.

In my case I decided to use the parasitic antenna as a director because slightly greater gain can be obtained in this manner. With the spacing between the antenna and director as one-tenth wave length there are two ways to adjust the length of the director. One way is to cut for exact resonance and maximum gain or make it a trifle shorter and minimize backward radiation. The latter was decided upon for reduction of QRM in both reception and transmission, the antenna being used for both. With this I still realized a 5DB gain over the ordinary doublet, or a signal equal to a power increase of 3 times.

At this point it might be wise to give a few details of the construction of this unique folded beam. It may look like a very complicated affair to mount on a pole and still swing through 360 degrees, but this was not so.

The upright mast is a 20' piece of 3x3 straight grained stock. Be careful to select a piece without knots. The length will of course vary with the different locations, but 20' left us about 6' for mounting inside the roof at this location. However, it is important that a good solid piece of wood is selected, because the finished squisher will not be guyed, except perhaps in some stormy locations.

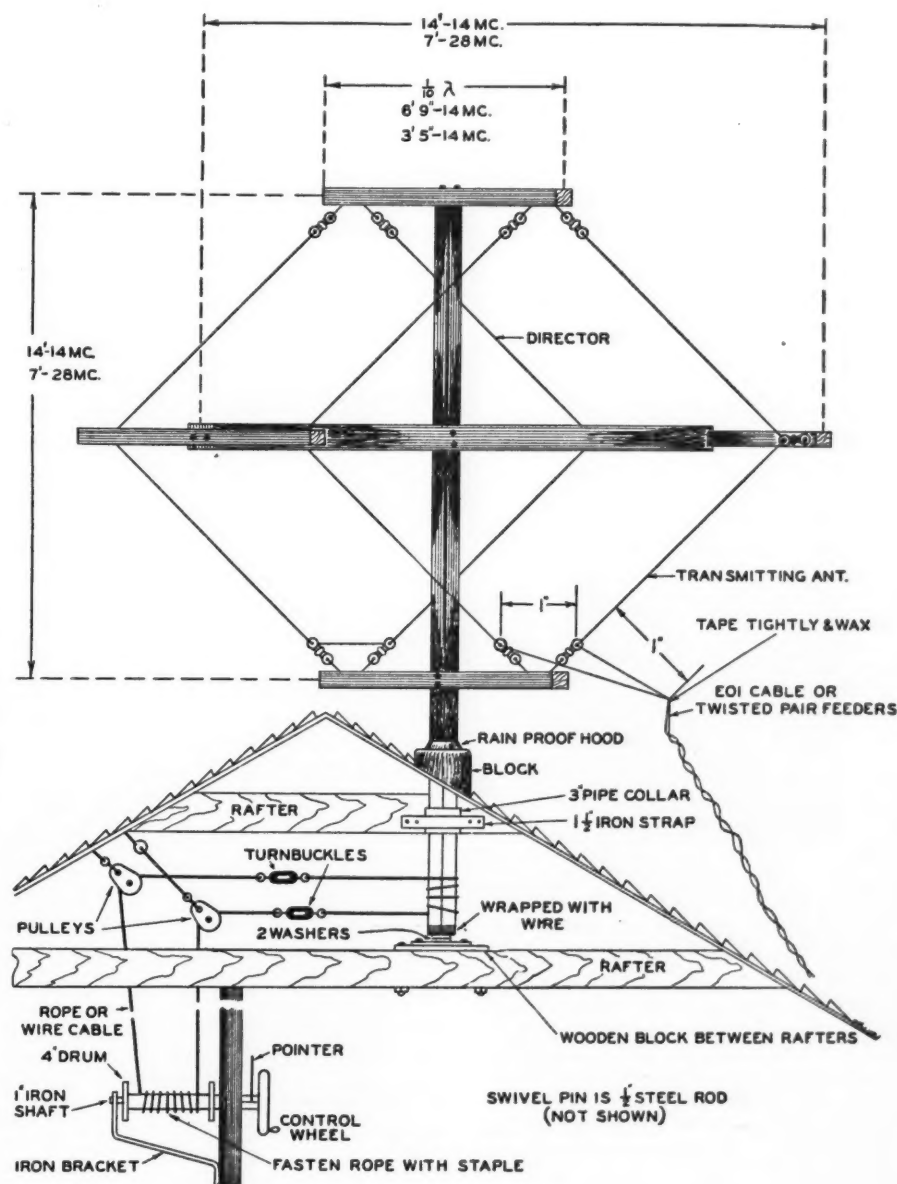
That problem I'll leave to the unfortunate one living in such a place. The

squirter for 28 MC. will have physical dimensions only half that of the 14 MC., so guying problems should be eliminated entirely in any location.

The cross-arm for the 14 MC. array will be a 14' piece of 1½x1½. This piece has less physical strain than the mast and can be lighter. Care should be used in the selection of the wood, as in the mast. The smaller beams used to separate the director from the radiator may also be made from 1½x1½ stock 6' 9" long, four pieces required.

I feel that the diagram will explain the construction better than words could possibly describe it, and, since no amateur follows constructional details entirely, I will let the individual amateur exercise his ability of inserting his own ideas.

The length of the radiating wire each side of the center of the di-pole is 16' 6" for the center of the 14 MC. band, or 8' each side for the center of the 28 MC. phone band. The director length in this instance is 15' 3" each side for 14 MC. and (Continued on page 55)



Not too unsightly, this squisher would be just the thing to go after that WAC.

A Serviceman's Diary

by JOHN H. POTTS

The boss shows us how to make calls with the help of a cop and a little dog.

THURSDAY. Arrived a little early but found the boss already in. One could tell by the way he paced the floor with his head down and his hands shoved deep in his pockets that he had something on his mind. It was unusual, though, to find him right here in the showroom, exposing himself to interruptions from prospective customers while he was evolving some new scheme to increase business. More often he would be seated at his desk in a tiny, partitioned compartment in a corner of the store, absorbing vitamins from a small combination sun-lamp and desk-light while studying charts.

"A good serviceman should be a good salesman," he announced.

That meant me. Another lecture on salesmanship was just about due, anyhow. Sets haven't been moving so well lately.

"How many times," he continued "does a serviceman dash into a house, replace a burnt-out tube and run out, all in less than five minutes? He may have with him a couple of hundred dollars worth of time, impressive test equipment, yet he doesn't even bother to open it so that the customer can see how well equipped he is. No wonder the public kicks about high service call charges! Take the doctor, for instance.

"Does he need to push a thermometer into your mouth to find out if you have a fever when your eyes and head are burning? He doesn't need to pull out a watch (and it's always an expensive one) to find out if your pulse is fast. Nor to write a prescription in Latin . . . plain English would do the trick. And dentists! When a tooth has to come out, isn't there a pretty nurse to hold your hands and smile sympathetically into your eyes—"

"You've got something there," I interrupted. "I've always felt sort of lonesome driving around alone on a slew of calls. Now I know a swell girl—"

"Never mind," he snapped, "I'll keep you company on a few calls today and show you what I mean."

We hopped in the car and started out. With 12 calls already on the hook, we'd have to do some fast stepping to get through the schedule. He realized it too.

The first call was in an adjoining town. As soon as we got to the parkway the boss opened up again.

"Step on the gas," he said. "We advertise fast service—so let the people see the truck scoot by. It makes a swell impression."

I followed orders but we hadn't gone a mile before a blue-clad figure on a motorcycle appeared on my left and motioned for me to pull over to the curb. He stopped

just in front of the car, pulled out a book and took down the number. After the usual bawling-out he handed me the ticket.

"You can show this valentine to the judge," he added.

We continued on our way at considerably reduced speed, the boss murmuring something about advertising rates being too high in this particular section. Arriving at the first stop half an hour late, we marched into the home, the boss carrying a satchel of tubes while I had a tube-checker and analyzer. The lady seemed a little annoyed at our being late and her Scotch terrier barked furiously.



"I can't help it, Bergen; it must be this California weather!"

We walked gingerly over the waxed and polished floor, which was partly covered with scatter rugs, and moved the set down the livingroom so we could work on it without disturbing a game of bridge which was already in session. The hostess rejoined the other three women and they continued playing without paying the slightest attention to us. Nevertheless the boss carefully opened the two test instruments and spread out on the floor the cables, test prods and adapters. Still no interest from the bridge players but not so the pup.

One of the adapters proved an irresistible temptation. He picked it up and ran over to a corner of the room where he dropped it and stood guard with his head cocked on one side and his stubby tail wagging joyously. The boss bent over in a dignified manner, muttering something for the dog's ears only. As he made a grab for the adapter, however, the pup beat him to it and scampered over by the bridge table. Then he asked me to try my luck, suggesting in an undertone that I be careful

not to disturb the ladies. I crawled along the side of the room, pretending to be tracing the aerial lead-in wire, until I got near the adapter. Then I made a sudden stab for it. So likewise did the pup, but caught my finger instead. As I jerked it out of his mouth, I hit the table leg and it collapsed, cards, cigarettes and ash-trays crashing to the floor.

The women glared at me. I fixed up the table with the assistance of the others and both of us offered apologies.

"I think," the hostess said icily, "that you men had better come some other time to carry on your activities."

We agreed, leaving as promptly as possible. She would not care to make another appointment at the moment, thank you, but she knew the phone number and could call up again of course.

We moved on to the next call, neither of us having much to say. When we reached the place I suggested that I go in alone. After all, I had already called yesterday and given an estimate and now that they had agreed to have the work done, there was really no occasion for further sales effort. But he insisted on coming in, pointing out that the set was nine years old and it was high time the customer bought a new one.

The lady greeted us very cordially and we were relieved to note there were no dogs or other companions around. The boss showed pamphlets describing the newer receivers and pointed out their advantages. Of course, too, he would be glad to make her a good allowance on her old, obsolete radio. Just to show how radio had progressed, for instance, he would like to demonstrate a little midget which we had in the car and which cost only fourteen ninety-five.

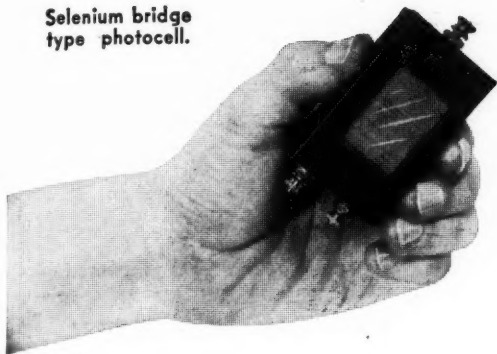
"Why," she said, "it plays better than my big radio and costs less than the repair charge your man quoted me. Perhaps you could allow me ten or twelve dollars in trade for my radio?"

"The allowance," the boss explained, "is standardized at ten percent of the price of the new set you purchase. For your present radio, I could only give you a dollar and a half in trade for this fourteen ninety-five set but if you want a two-hundred-dollar radio, I could allow you twenty dollars."

"Ridiculous!" she cried. "If my radio's worth twenty dollars on one set it's worth twenty on any set. And if it is worth only a dollar and a half, then why should I spend fifteen dollars to have it repaired?"

The boss looked at me but I kept quiet. After all, he's the salesman. But I hated

(Continued on page 79)

Selenium bridge
type photocell.

THE DEVELOPMENT OF PHOTOCELLS

by ELMORE B. LYFORD

Photocells are used today in almost every industry as control means. They change AC to DC, protect personnel, announce presence of smoke, and aid photographers. Photocells, themselves not new, have awaited the development of the radio tube for their general use.



The author, an outstanding authority on the photocell.

PROBABLY no development of modern science has been associated with more popular misconceptions than has the photocell. This is due in part, no doubt, to the innumerable uses to which it may be applied—all seemingly entirely different.

Boiled down to its fundamentals, however, the photocell is one of the simplest of modern devices; and, considering the complexity of its forms and uses, the basic types in which it may appear are very few.

The accompanying chart illustrates the various known types of photocells.

The two main groupings of photocells are the "resistance" types and the "battery" types. The first are nothing more than resistances whose values change with the amount of light falling on them, and those of the second type are simply miniature batteries whose output increases with increasing light. All selenium and photo-electric cells should be considered as *variable resistances*, and all wet and dry types of voltaic cells, *simple batteries*. If this one fact is kept in mind, the whole subject of photocells at once becomes much more understandable.

Before photocells of any type can be put to use practically, however, some

further knowledge must be at hand. In selecting the proper type of photocell for any particular use, its over-all sensitivity and its output must be considered, and sometimes its speed of response and its color-sensitivity (its relative response to illumination by variously-colored light) as well. For example, a dry-disk type of voltaic cell is useless for sound-movie use, because its speed of response is not adequate—it would not accurately follow the rapid changes. Also, a vacuum-type photoelectric cell is not suitable for burglar alarm use because its output is too small—it would require too much amplification before it could be used to operate a signal.

Referring again to the accompanying chart, let us determine the other characteristics of these various types of photocells. With allowance for modifications due to construction, these general characteristics will hold for all photocells of the type, and it will be well to bear this in mind when selecting the type of cell most desirable for any particular use.

(1) The selenium cell, or "selenium bridge" as it is more correctly known, works on the well-known principle that the metal selenium changes its electrical resistance when light falls upon it. Its resistance is relatively high in the dark, and relatively low in the light.

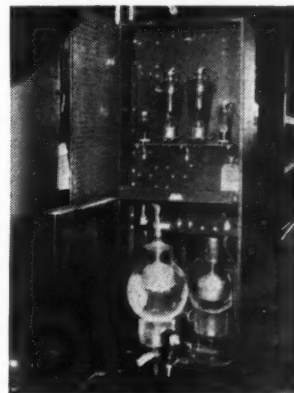
It is generally constructed of several films of selenium, each separating parallel conductors, and under the influ-

ence of light allows more current to flow between these conductors. There is always some current flowing through the cell—lighted or dark—and the *increase of current with light* is what is utilized, generally to operate a small relay and close a secondary circuit, or to operate a meter for measuring purposes.

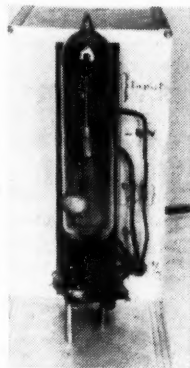
Under these conditions, as large an increase in current as possible with a given change in light is wanted, and the efficiency of any selenium cell is gauged by the ratio of its "*light-current*" to its "*dark-current*." Any relay used with this type of photocell must be so constructed that it will operate on this *difference* in current, which is generally a minimum of less than one and a maximum of only a few milliamperes.

The speed of response of these cells is relatively slow—only a few changes per second at best—and they are, there-

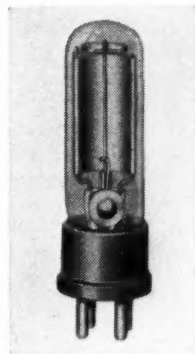
(Concluded on page 78)



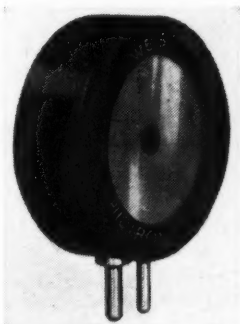
Thyatron photocell tubes used in rectifying large AC currents to DC.



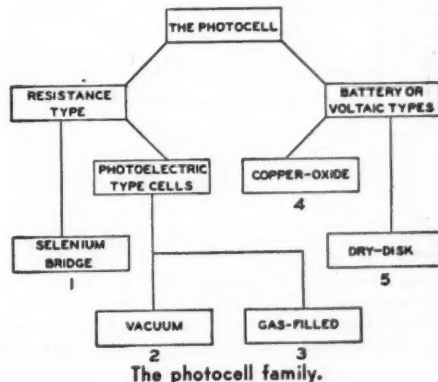
Early forerunner of sound picture photocell. Plate is in the middle.




Sound picture photocell. Inside of curved metal is sensitively coated.



Modern generative dry disk photocell used in detecting and measuring the light striking its surface.



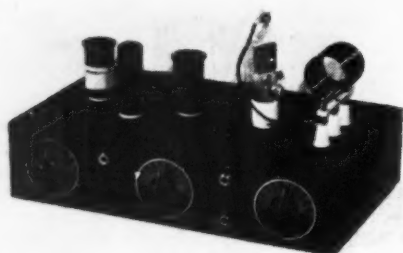
The HAM SHACK



This Month:

An easily constructed CW rig using the new T-40 tubes. No buffer required, yet it will work in every ham band but those below 10 meters.

by E. M. WALKER, W2MW
and HOWARD SULLIVAN, W9QGS



For simplicity, bread-board construction is still preferred by many.

GOOD design is important in the successful operation of an amateur transmitter. One of the most important factors in good design is efficiency. This is particularly true in low and medium powered transmitters where minor losses may account for the waste of a large percentage of the transmitter output when the power available is small to begin with. Therefore, in order to get the most out of transmitters in this category, extreme care should be taken in design and construction in order to get the most satisfaction.

One of the most important factors is the proper selection of tubes. If the pocket-book is limited, tubes should be chosen that give the most watts per dollar. Accordingly we set out to construct a simple medium powered c. w. transmitter that met these

requirements. The results obtained were surprising.

The popular 6L6 was selected as an oscillator because of its high output as a crystal oscillator, both at the fundamental frequency of the crystal and on its harmonic. The tube selected for the amplifier was the new T-40, a medium powered triode that has many interesting features. With this combination an output of close to 90 watts was obtained at 40 meters, which in these days of highly selective and sensitive receivers will do anything a high powered transmitter will, when given the advantage of a good antenna.

The transmitter to be described may be put together in a few evenings at a cost of less than \$25, providing a lot of watts per dollar. The whole unit is mounted on a black crackle-finish chassis 17 by 10 by 4 inches. The deep chassis was chosen so all tuning controls and wiring could be concealed under the chassis.

As may be seen from the illustrations, the components above the chassis include only the tubes, coils and crystal. These are laid out to follow the schematic wiring diagram as closely as possible, thus facilitating short connections. Atop the chassis, at the extreme left (2½ inches in from the end) is the 6L6 grid coil; to the right of this and slightly to the front, is the oscillator tube, itself, and behind this on the same axis across the chassis is the crystal. The oscillator plate coil is at the right of



A husky supply is needed to deliver the power which the T-40 can handle.

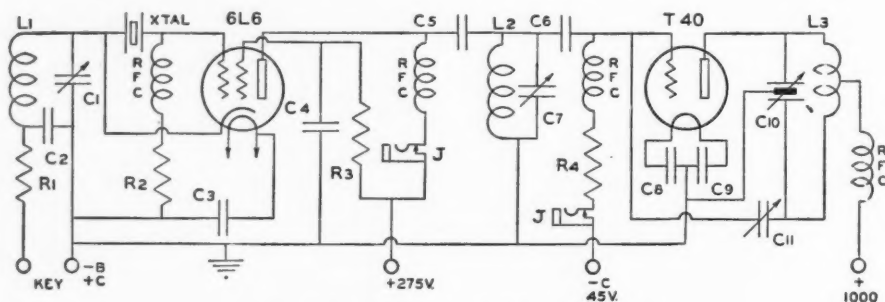
the tube and crystal, the T-40 is next behind this and through the chassis is the neutralizing condenser, and finally at the extreme right is the amplifier plate coil.

There are three controls on the front end of the chassis, each mounted approximately in front of its respective coil. Between the two dials at the left is a jack connected in the plate circuit of the oscillator; between the two dials at the right are two jacks, one for the amplifier plate current meter (at top) and the other for plugging in the meter to read the grid current of the amplifier.

Terminals for the filament, bias, plate voltages and the key are mounted at the back of the chassis. A terminal strip with seven terminals is provided for the filament voltages of each tube, the key and the minus C battery bias connection of the amplifier. Two porcelain lead through insulators are provided for the high voltages of the oscillator and amplifier.

The wiring diagram of the crystal oscillator is that of a conventional "tri-tet" crystal oscillator. This circuit was chosen because of its ability to provide high harmonic output thus making possible operation on two bands with one crystal. Four band operation may be had with two crystals with this arrangement.

One interesting feature of the oscillator is the incorporation of the key in the cathode circuit. This permits keying the oscillator thereby providing for break-in operation, which is almost essential now-a-days for efficient operation on telegraph bands. One characteristic of the 6L6 is that it must be adequately by-passed in order to obtain the greatest efficiency. Both

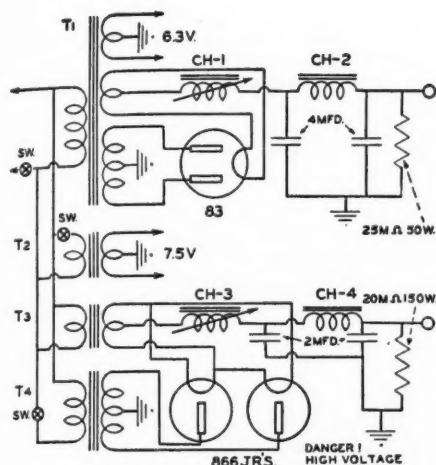


Circuit of the T-40 RF, and 6L6 crystal stages.

C1 —100 mmfd. var.
C2 —.002 mfd. mica.
C3 —.01 mfd. 450v. paper.
C4 —.01 mfd. 450v. paper.
C5 —.00025 mfd. mica.
C6 —.0001 mfd. mica.

C7 —100 mmfd. var.
C8 —.01 mfd. 500v. mica.
C9 —.01 mfd. 500v. mica.
C10—100-100 mmfd. var.
C11—15 mmfd. neut. var.
R1 —400 ohms 10 w.

R2 —.1 megohm 2 w.
R3 —20,000 ohms 20 w.
R4 —5000 ohms 10 w.
L1, L2, L3—See text.
RFC—Radio Freq. Chokes.
J—Closed Circuit Jack.



The Power Supply Circuit.

inb power supply circuit.

T1-Comb. Pwr. & Fil. Trans. (Utah No. 2291)
T2-Filament Trans. 7.5v (Thordarson 16F13)
T3-Rect. Fil. Trans. 2.5v (Thordarson 16F08)
T4-High Voltage Trans. (Utah No. 2294)
CH1-Swinging Choke (Utah No. 4501)
CH2-Filter Choke (Utah No. 4510)
CH3-Swinging Choke (Utah No. 4501)
CH4-Filter Choke (Utah No. 4510)
SW-Control Switches

the screen and the filament must be bypassed to ground through .01 mfd. condensers. Also it is important that the radio-frequency choke coil connected from the grid of the 6L6 to the 100,000 resistor and thence to the ground be used for smooth operation.

The tuning condensers in both the grid and plate circuits of the oscillator are 100 mmfds. each. They are of the midget type and have ceramic insulation, an important feature in obtaining good efficiency.

The output of the oscillator is fed into the grid of the amplifier through a 100 mmfd. fixed mica condenser. This method of coupling is not as efficient as link coupling, but the output obtained from the oscillator is more than sufficient to drive the grid of the T-40, so this method of coupling was discarded in the experimental model of the transmitter that was constructed in order to bring down the cost.

Bias for the T-40 is obtained by a combination of resistor in the grid circuit and a battery. Battery bias is used to provide plate cutoff when the key is open. A split stator condenser having a capacity of 100 mmfds. per section is used to tune the final amplifier plate circuit. This type condenser is used for several reasons: First, it eliminates the need of plate by-pass condensers; second, it provides permanent neutralization on all bands and, third, it may be mounted directly on the metal chassis because the rotor plates are grounded.

The transmitter may be operated on any of five amateur bands (10, 20, 40, 80 and 160) with the proper selection of coils. The grid and plate coils of the oscillator are wound on standard 1½ inch coil forms with four prong bases. The coils for the plate circuit of the amplifier are center tapped commercial units. Coil specifications for the oscillator follow:

Band	Grid	Plate
160 m.	26 turns No. 20 d.c.c. close wound	58 turns No. 24 d.c.c. close wound
80 m.	11 turns No. 20 d.c.c. spaced twice diameter wire	28 turns No. 18 d.c.c. spaced diameter wire

40 m.	6 turns No. 18 d.c.c. spaced diameter wire	12 turns No. 18 d.c.c. spaced diameter wire
20 m.	3 turns No. 18 d.c.c. spaced twice diameter wire	8 turns No. 18 d.c.c. spaced twice diameter wire
10 m.		4 turns No. 18 d.c.c. spaced twice diameter wire

For operation on 160 meter band a 160 meter crystal is needed. This same crystal may be used for 80 meter band operation, providing its frequency, when doubled, falls within the amateur allocation. Similarly an 80 meter crystal may be used for operation on 80 and 40 meters; a 40 meter crystal for 40 and 20, and a 20 meter crystal for 20 and 10 meters.

It is possible to operate the transmitter on 10 meters in two additional ways, but neither affords the same degree of efficiency as a 20 meter crystal. These are by doubling in the final amplifier plate circuit. Under this condition the output will not be much more than 60 per cent of the input. Also it is possible to quadruple in the oscillator circuit, i.e., use a 40 meter crystal and coil in the grid circuit, and a 10 meter coil in the plate circuit. Sufficient grid current will be obtained by this method to drive the T-40 for operation at slightly reduced output, slightly more than may be obtained by the doubler-amplifier arrangement.

To put the transmitter on the air, an adequate power supply is necessary. One that is capable of delivering 1,000 volts at 200 milliamperes should be used. Reduced plate voltage may be used on the amplifier, but inasmuch as the tube is rated to operate at 1,000 volts, it is desirable to use this voltage in order to enjoy the capabilities. Voltage for the oscillator may be obtained from a voltage divider. It was found in tests made with the transmitter at the writer's shack that 275 volts on the 6L6 plate will provide ample excitation to the amplifier on all bands.

A 45 volt C battery is necessary to provide a complete cut off in the amplifier tube. A filament transformer with two windings (6.3 and 7.5 volts) should be used.

No specific method of connecting the transmitter to an antenna is shown in the schematic diagram. So many systems of coupling are available that showing one would not meet the requirements of everyone. However, the two most popular and simplest methods are link coupling with a twisted pair feeder and the single wire matched impedance system. Both are excellent. The twisted pair method requires only a small loop (usually about one turn) wound around the plate tank coil with its ends connected to the feeders. A single wire feeder is connected directly to the tank coil. It should be remembered that the closer this tap is to the plate end of the coil, the heavier it will load the amplifier.

After the transmitter has been set up, that is, with the plate supply, bias battery and antenna connected, it is ready to be tuned. The 1,000 volt positive lead first should be temporarily disconnected, then the plate voltage turned on. This, of course,

after the filaments have been given sufficient time to heat. The oscillator grid condenser should be set somewhere around the maximum capacity point. The key circuit should be closed. The plate meter should be plugged into the oscillator plate jack and the oscillator plate condenser rotated until there is a decided dip in the plate current. Sometimes holding a small neon bulb near the plate coil will be helpful in determining whether or not the circuit is oscillating.

Next a meter should be plugged in the grid circuit jack. The grid current should be somewhere between 30 and 40 milliamperes. In the writer's case, it averaged about 37 milliamperes which is more than sufficient to drive the amplifier to full input. The maximum grid current rating on the T-40 is 40 milliamperes.

Now the amplifier should be neutralized. Here, again, a neon bulb will be helpful. With the amplifier plate voltage disconnected, the amplifier plate condenser should be rotated and the neon bulb held near the plate end of the coil. When the circuit passes through resonance, the bulb will glow, unless the amplifier condenser was accidentally set at a point where it neutralized the circuit. Then the neutralizing condenser should be rotated until there is no indication of radio frequency in the plate circuit. Also when the plate condenser is rotated through resonance, the grid current should remain stable. When this condition is obtained the amplifier is neutralized.

At this point the plate voltage of the amplifier should be connected. The power should be turned off before touching the plate lead. Next, with the plate voltage applied and the key down, the plate condenser should be rotated until minimum plate current is obtained. The transmitter now is ready to couple to the antenna.

During a brief test made with the transmitter at the writer's station, excellent results were obtained. While contact was not established with any extremely distant stations, the transmitter gave evidence of being capable of rivaling the one-half kilowatt unit at the writer's station.

Power Supply.

THE power supply shown in the illustrations was designed expressly for a transmitter using a 6L6 crystal oscillator and a T-40 amplifier. A 6L6 used as an oscillator draws about 120 milliamperes total plate and screen current. Consequently all components in the oscillator power supply must be rated at least 400 to 450 volts and at 150 milliamperes. The power transformer supplies oscillator plate and filament voltage as well as filament voltage for the 83 rectifier. Choke input is used which gives good voltage regulation. The degree of regulation is increased by the fact that a swinging choke rated at 8-30 henries at 200 mls is used. The second is a filter choke rated at 10 henries at 200 mls. The two condensers are each 4 mfd. oil-filled, 750 volts rating. A switch in the 110 volt primary of the power transformer is placed on the front of the panel, controls the 6L6 filament, 6L6 plate, and the filaments of the 83 and the two 866-Jr.'s. The

(Continued on page 59)

DEAR JOE:

by ARNOLD KING, Jr.

The experiences at sea on his first trip are told by the junior radioman in this letter to his friend. Copying press, and a bath in a mud hole are on the itinerary.



"I save steps to the rail with a bucket . . . and the bugs around the place don't help much either . . ."

DEAR JOE:

Guess you've been looking for a letter for a long time now. Only reason I didn't get one to you was my new job . . . radio op on a ship . . . yeh, I'm now a commercial op.

May as well begin by telling you all about the first trip and all that sort of thing. Seems as though when we pull out I am "on watch." No instructions or anything but I am on. The chief is a guy who hasn't been to sea in years . . . a chronic sea-sicker . . . who, now that he has had all his teeth pulled and a false set mounted, thinks he'll be able to weather the storm. He's not a good op either as I am soon to find out.

Gosh, we're no sooner out in the harbor than WNY calls me and has tfc. . . I copy the message on 600, though he is on 630 or so, because he is so close . . . he tells me to go "up" and I want to find out what that means, but he gets sore and tells me to get the chief . . . the chief says the message is O.K. and what is all the hollerin' about and for me to ignore that fellow. I have a few more messages to send and then we are really out to sea . . . and I begin to feel it. Mind now, I've been on a ship before . . . but on a *ship* and not a thing like I'm on now.

This thing has the radio shack right above the propeller . . . and does she shake you up! Our quarters are just fore of the shack . . . guess they have to get you in shape for such a job. The ship runs down and around Porto Rico . . . and such places . . . I don't know that when I sign on . . . everybody stays away from the radio men . . . maybe they have some kinda catchy disease . . . I wonder. I get off a bit and go down and have supper, which isn't bad . . . but the meals get worse as their number grows . . . get it? . . . the more you have . . . that is, meals, the worse they are.

At 8 P.M. I am off watch and hit the hay. The chief says to leave the lights on because they keep the cockroaches from running over you . . . good to know that . . . eh, Joe? I feel O.K. in spite of all

and do get off to sleep. But 2 A.M. rolls around pretty quick and another watch is "on." Oh, sure, we do six hours on and six hours off and you have to break up the hours off and on in order to get a meal . . . though I cease to worry about them after a bit . . . too many trips to the rail . . . no, not the bar-rail . . . just the rail on the side of the ship.

Just about the time I'm on, the sea begins to kick up a lot and we start rolling around. What with all the rolling and the natural vibration of the ship, I am not long in being rolled rail-wards. During the watch I make frequent trips in that direction . . . later to save steps I get a bucket . . . I am not on watch so very long after when the Mess Boy brings up some food. The coffee has a smell to knock you over and the bread on the sandwiches is all soggy; the boloney is smelly, too, but not with boloney smell . . . I heave all that stuff over the side or in the bucket, but not before it has taken a detour within. . .

There seems to be nothing to do on my watch but make an entry in the log once every fifteen minutes. . . In the A.M. there is a weather message to get off, but I cannot manage to do that, so leave it for the chief . . . no, I don't go down for breakfast . . . I just go up to the old bunk and try to forget where I am . . . one way to get over being sick. Phillip . . . he's the steward . . . says I ought to go out on deck and get some air and not look at the sea . . . but I can't do that, for the sea is all around us and kicking up quite badly . . . one minute we're high and the next we're low—with twenty or more higher waves around us—I mean twenty footers.

All weather report copying comes on the other fellow's watch and he is having plenty of trouble with it . . . he can't copy the numbers and they are the most important things, because from them the weather maps are made on board ship . . . and storms located . . . it is all the more important because the skipper says we are

running around a hurricane and if we are to get through all right we have to have that information.

The next night the chief wakes me up and begs me to copy the weather . . . says I can sleep longer and all that sort of thing. I get the mill all set to start, but the ship rocks and bounces so much that it won't stay put long enough for me to hit a key . . . so back to the pencil I go and make a good copy despite terrific static and vibration noises . . . all this with frequent head bendings to the aforementioned bucket. Try copying code that way some time—quite a thrill!! Every one is worried about the weather and whether we will weather the storm . . . but I seem to feel that I'd be better off if we wouldn't . . . that's how sick I am. Gee, Joe, I hate to tell you all this stuff, but we are soon to start back again and I know what I'm in for, so am trying to bolster up by getting it off my chest.

Well, I try to copy the stuff on the mill now that I have it in pencil, but one tap on the mill and I have to give up . . . including everything I've ever eaten, too, it seems, and that is the end of that . . . I get the chief and tell him he'll have to transcribe the stuff, which he does. I pile in the bunk and, boy, what a relief! . . . never feel so good as then. Sure, I can see the big roaches and all that, but as long as they stay off my face, what do I care . . . all the other kind of bugs seem to be in the chief's bunk, which I don't mind a bit.

We have a few more days of that kind of stuff and then we are in port . . . San Juan. I was there once before on an Army Transport . . . Chateau Thierry . . . but they wouldn't let us off . . . had too much trouble with the fellows on previous trips . . . getting soused and raising the dickens. . . Even on that trip they had trouble . . . seems that a fellow stowed away in Colon . . . one of the army boys . . . with only a few more months to do . . .

(Continued on page 65)

Signal Squisher

(Continued from page 49)

7' 4" on 28 MC. The space between the radiator and director is 6' 9". The picture shows clearly how the wires should be strung, and how the insulators are placed.

There are several means of rotating the beam that I could think of, but finally decided on the one shown, using rope, pulleys, and hand wheel, because the transmitter is located in the attic close to the antenna. The array could readily be adapted to the conventional means of motor drive. The final means of rotation will be left to the individual, who probably has his own ideas of how it should be done in his location. The one thing to remember during erection is that the mast must be perfectly perpendicular, if it is to rotate freely without binding. The base bearing can be made by sinking one-half one-inch steel pin about 5 inches long into the base of the mast and placing 2 large washers over it. The base of the mast should be wrapped tightly with wire to prevent splittings under heavy strains. This may then be set into a base made by placing an iron plate about 5 inches square on a block of wood, bolting it down, and drilling one-half inch hole in the center to take the mast-pin bearing. The bearing should be greased well. A collar bearing must be made and placed where the mast enters the roof. This may be made by driving a 3-inch pipe collar up the length of the mast and shaping 2 pieces of wrought iron around it so that the collar will rotate freely within the wrought iron clamps, which may be bolted to the roof.

The method of feeding the antenna used here was found to be quite efficient, because of the short feeder length. I used 15' of E01 cable fanning the last foot, connected at the antenna, to form an equilateral triangle one foot to a side, as shown. This gives a fair impedance match.

The test for a proper impedance may of course be made in the regular algebraic manner. A quick test for the amateur is to note the final tank condenser setting before attaching the feeders to the rig, and if the final condenser need not be returned for resonance after the antenna has been hooked on, there is a good match. While not all-inclusive, this method has been successfully used by the majority of the hams.

The results proved the losses to be negligible. The feeders may be run loosely along the length of the mast allowing for the rotation. They may then be coupled to the final amplifier tank coil of the transmitter by a single-turn link. The results were checked and proved very gratifying. An R6 signal 3,000 miles distant on the ordinary doublet was stepped up to an R9+. Checking for back-wave transmission with the same station by rotating the antenna to the opposite direction, my signal could not be heard. So I felt my job was completed and I now possessed a truly unidirectional beam which has proven itself worth the effort of erection.

-30-

Ave-Noise Silencer

(Continued from page 46)

sistor connected to the grid of V2.

This filter delays any change in volume by $\frac{1}{4}$ second, so that changes caused by the expander will not be too sudden or too slow, but correct for symphonic or classical music. The degree of volume expansion is controlled by the potentiometer R_3 which regulates the voltage finally used to vary the automatic "gain control potentiometer" consisting of the top 300,000 ohm resistor and the internal resistance of V2.

In operation at the low level of $\frac{1}{2}$ volt from the detector which should precede it this expander will give any desired degree of expansion from zero to 23 db., depending only upon the setting of potentiometer R_3 . For an average of 1 volt signal input it gives 28 db. expansion, 33 db. for a 2 volt signal and 35 db. for a 3 volt average signal input. This it does without distortion, and such distortion as is intentionally introduced through overbiasing of expander amplifier tube V3, is completely ironed out by the syllabic filter in the grid circuit of V2, which allows no audio frequency voltage to get through, but only the slow variations in rectified d.c. provided by V4.

A model of this expander is $4\frac{3}{4}$ " long, $2\frac{1}{2}$ " wide and $5\frac{1}{2}$ " high over its two tubes. It may be mounted in the side of a receiver cabinet by the nut on its control knob shaft bushing, thus requiring but one $\frac{3}{8}$ " hole for mounting. Connection to the receiver requires the breaking of: one audio grid circuit connection, the leads to the 6.3 volt filament circuit, the B minus and the B plus at any convenient point in the receiver.

When the expander control potentiometer R_3 is turned "off," in the circuit shown, its on-off switch ("Y") breaks the cathode lead to V2, thus eliminating its low resistance shunt from the audio circuit, and allowing the full 23 db. gain to V1 to be added into the receiver's audio circuit. No hum will show up due to the increased audio amplification because of the 15,000 ohm-1/10 mfd. filter in the plate circuit of the audio amplifier V1.

For the operator desiring noise reduction in communication work, a simple change makes this expander into a noise squelcher which works extraordinarily well.

To be effective upon noise crashes of short duration, the value of the $\frac{1}{2}$ mfd. filter condenser from V2 grid to ground should be cut to about .001 or .002 mfd., and in order that noise crashes may be cut to less than average signal volume, a 2000 ohm $\frac{1}{2}$ watt resistor shunted by a $\frac{1}{4}$ mfd. condenser should be connected between the cathode of V2 and ground. With such connections, which can be taken care of by a four contact, two position switch, either volume expansion or noise silencing can be had.

The noise silencer will not entirely eliminate all static. It will soften most of the atmospherics to a mere rushing sound which is not objectionable. To test it, turn the noise silencer on full, and see if the receiver is blocked when a broadcast station is suddenly tuned in.

-30-

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Homebuilt Audio Oscillator

(Continued from page 39)

plifier and a resistance load is used in the plate of the output tube. This was chosen because the only alternative, an output transformer of excellent frequency response, meant high cost. The natural tendency of resistance coupled amplifiers to have a characteristic rising with frequency was largely counteracted by the use of degeneration.

The volume control was placed in the output circuit in order to obtain negligible hum components even at the lowest output levels. By this method the ratio of hum to signal remains fixed. Were the volume control placed directly after the mixer, as is the general practice in low-priced units, the hum would become much greater in comparison to the signal as the volume was reduced.

The very uses to which a beat frequency oscillator is put, make a vacuum tube voltmeter a necessity. In this unit the meter is brought out to a separate terminal; the customary practice is to bridge it directly to the output terminal within the instrument. Calibrated readings in both the input and output circuits of amplifiers are therefore possible.

A separate voltage divider is provided for the vacuum tube voltmeter. This improves power supply regulation (the current for the meter does not pass through the chokes) and thereby eliminates frequency flutter in the output when the volume control is suddenly turned full on with the meter connected.

The layout is compact. The component parts are so placed that the path of the signal is progressive and long leads are eliminated. The front panel is simple and businesslike. The power supply is grouped in one corner with the power output tube adjacent to it. The most sensitive circuits, those of the oscillators, are placed well away at the other end of the chassis. The variable condenser is mounted on rubber grommets to eliminate microphonic effects which could otherwise become annoying. (Only one section of the standard two section broadcast variable condenser is used.)

The oscillator inductances and the tuned tank are made from ordinary single tuned intermediate frequency (IF) transformers. The rated frequency is not important, but the three should be identical. Mica dielectric trimmers were used in the unit being described, but air trimmed transformers are preferable.

The transformers are carefully removed from their cans and the following changes are made. As soon as each has been reconnected, it should be returned to its can and marked to eliminate the possibility of error in placement.

For the variable oscillator inductance: The trimmer is disconnected. The primary and secondary of the transformer are connected in series so that both windings run continuously in the same direction. The trimmer is connected to one end of the primary and one end of the secondary. Three leads are brought out, two from the

trimmer and one from the junction of primary and secondary. When the windings have been replaced in the can, a zero adjuster is made from a small right angle bracket, a piece of fibre rod filed to a screwdriver shape on one end, and a knob. This is clearly shown in the illustration.

For the fixed oscillator inductance: The primary and the secondary are connected in series so that both windings run in the same direction. The trimmer is connected to the two open ends left. Three leads are brought out, two from the trimmer and one from the junction.

For the tuned tank: The primary and the secondary are again connected in series and the trimmer is connected across the two outside ends. Only two leads are brought out, however, one from each side of the trimmer.

The front panel is of aluminum and measures seven inches high by fourteen inches wide. The chassis is of plated steel seven inches deep, thirteen inches wide and two and a half inches high. Both these items are standard and can be obtained in any parts store. Detailed spacings and sizes of holes are not given because the parts will vary with different builders. It is impossible to go wrong if the general placement shown in the illustration is followed.

The output volume control (marked A in the diagram) is an ordinary 5,000 ohm wire wound potentiometer. It would be well worth the slight additional expense, however, to substitute an *L pad* at this point. Such a pad would keep the output impedance of the beat frequency oscillator constant regardless of the output level. In the described unit, this output impedance changes with each change in volume.

Degenerative coupling is used in the output for the sake of its response-improving-and-flattening effect. The 10,000 ohm wire wound potentiometer (marked B in the diagram) serves both as a cathode bias resistor and introducer of out-of-phase signal voltage. It should be noted that the 5 mfd. low voltage electrolytic at this point is connected from the cathode to the potentiometer arm and not to the ground.

Both sides of the primary of the power transformer are connected to the chassis through .01 mfd. fixed condensers. If a transformer with an electrostatic shield between primary and secondary can be had, so much the better. These precautions will be appreciated when the beat frequency oscillator is used in connection with sensitive receivers or to modulate the output of a signal generator.

The wiring diagram should prove self-explanatory as far as connections go. The RF chokes are the standard broadcast type wound in *pi* form; the values are not critical. The trimmer marked C is a *pad*der for the variable condenser; it enables the full audio scale to be spread over the entire dial.

Putting this beat frequency oscillator into operation is easy. Turn the unit on (the switch is the knob under the dial) and touch the grids of the oscillators with the prong of a high resistance voltmeter. If they are oscillating properly the grids will show negative.

Next connect a pair of phones or a small

loud speaker to the output terminal and advance the volume control slightly (the knob under the meter). Tune the tank to the fundamental frequency of the fixed oscillator. This can be done in various ways as, for instance, by watching a meter in the plate circuit. The dial is then set to zero and the zero adjuster on the can of the inductance is turned cautiously until zero beat is heard. (Later zero beat adjustments are made much more accurately with the vacuum tube voltmeter.)

The padding trimmer C is then manipulated until the highest audible frequency comes at the high end of the tuning dial. The coupling trimmers D and E are turned to the positions (usually around their lowest capacities) which will give the purest notes. The degeneration control B is also set at the best point. An oscillograph is a great help at this point in inspecting the wave form, which should be pure.

When everything is running smoothly, a calibration chart of the beat frequency oscillator is prepared. The easiest method, of course, is to compare it to a standard. Another way, and the one used for the instrument being described, is to check it against a broadcast station making a frequency run at night after the programs cease.

It is customary for the large broadcasters to make these frequency runs at regular intervals. They do this by modulating their transmitters with audio frequencies from the lowest to the highest. A telephone call to the operator will identify the frequency in cycles per second; the identical frequency on the oscillator is then logged by dial degrees. The lowest frequencies, that is harmonics and sub-harmonics of sixty cycles, can also be obtained by beating against the power supply using two speakers or phones, one connected to the AC line through a resistance, the other to the oscillator.

The vacuum tube voltmeter is quickly calibrated in RMS values by means of the 25,000 ohm potentiometer and the AC voltmeter hooked up as shown in the diagram. The tube is of course first set practically at cut-off by means of the variable cathode tap on its voltage divider. The plate tap is set at a value which will allow the tube to draw a maximum current just enough to swing the meter full scale. The false zero will be slightly above the actual zero on the meter; the needle is set back before calibration by means of the screwdriver slot on the meter face. The false zero current could be balanced out with a resistance network, but this refinement does not seem necessary.

The power transformer is the standard broadcast receiver type. The chokes are the small ones usually found in low priced receivers. Three wet electrolytic condensers are used in the two *pi* section filter and a dual dry electrolytic is used across the taps of the main voltage divider.

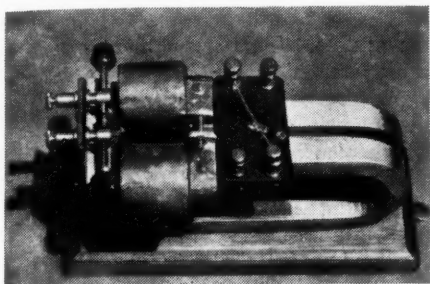
A milliammeter of 0-50 range was incorporated in the beat frequency oscillator being described because it was the only one available. The internal shunt was removed and it was then possible to get full scale deflections easily with the type 76 tube when measuring the output of the unit.

Polarized Relay

(Continued from page 41)

bend slightly together to make the contact screws self locking.

A small panel can be fastened to the permanent magnets to provide connections for the coils. It is advisable to use four binding posts so as to provide



The completed polarized relay. Simple, compact and efficient, it will give excellent service.

series or parallel connections for the coils. This will furnish one-half or double the resistance of each coil, as a total resistance.

In use, the armature will be attracted to one pole piece or the other, depending upon which side of center it is released. The contacts, however, hold it in the position desired. The relay will be most sensitive when the armature is nearest a central position.

To adjust as a sensitive simple relay, one contact is screwed to just past center so that the armature when pressed to this contact, with no current flowing in the coils, will just fall back to the other position. Then with the current desired to close the relay, flowing in the coils (in the proper direction), the other contact is moved up until the relay trips.

This last mentioned contact controls the closing sensitivity, and the former contact the release sensitivity.

—30—

Newscaster

(Continued from page 25)

Japanese don't know that. Likewise, a gentleman from China is *not* a "chinese." In the best of tongs he is a "Chinese." If you are from the South, be sure you pronounce it "Nee-grow" and not "Nig-grow." In Chicago alone, some 300,000 of them sit patiently by loudspeakers listening to your words. You're not pleasing them by terming them "colored," either. Anyone may be colored to some extent. That is, one may be yellow, light yellow, red, etc. Each race is as proud of its heritage as we are of ours.

Strangely, the Indian doesn't mind being called a red man. But you'll please him—and Indian lore students—immensely if you mention the tribe from which he sprang.

Comes now the most interesting part of

the work—picking up the paycheck. How large will it be? That depends mainly upon your ability as a driver of bargains and upon public acceptance of your work as evidenced by fan mail.

If you are still working on the small station—for nothing—maybe you'd better go back to straight announcing. After a while, even the "one-lungers" scrape up ten to thirty-five dollars per week for newscasters. Usually one has to double as announcer-newscaster and phonograph record turner, but it's lots of fun if you can keep living while doing it.

Let it be known among the advertising agencies that your newscast is open for sponsorship and you might get a bank-roller—in which case both you and the station profit (and, we hope, the sponsor!). Some of us are rather lax along these lines—but it is a good idea to be sponsor-conscious.

Having a sponsor—or a regular job on a powerful station—you may be excused for looking ahead. Perhaps for even seeing a few Success Mirages in the distance. Individuality will get you there quicker than other means. Don't copy Winchell or Hill, but decide definitely on a style and stick to it. Be breezy, staccato . . . or pontifical, ponderous. It makes little difference which. The public likes its Winchells and Hills equally well. Both men draw down about \$1,500 to \$2,500 per week from radio alone. Winchell still sticks mainly to his gossip idea, which puts him in a different class from most newscasters, of course.

If you shift from straight newscasting to commentating, be sure first that you have the "background." Endless research into the topics being argued are necessary, for out on the Great American Plains, listening to you, will always be men and women who really know more about the topic than *you* do! They'll catch your every error and tell you and the sponsor about it.

Don't worry about a few complaints. They come with the business—and the five-day week hasn't helped this field one bit. What has this short week to do with complaints, you ask? Plenty! People have more leisure, learn more, do more checking in dictionaries, encyclopaedias; are more critical, write more letters.

You'll get threats of libel and slander suits, too, regardless of how careful you are. Sticking to script won't eliminate all of them. One of the most celebrated air suits concerned Walter Winchell. Commentators all over the nation watched that suit in an Eastern court with bated breaths. Had W. W. lost, it would have set new standards of mike conduct for all of us. Fortunately, he didn't lose, and our standards were saved.

No peeping through keyholes got Winchell in trouble that time. It was the simple reading of a tiny item he included in his "Oddities in the News." A gardener had enacted in real life the old bromide about the tree surgeon who climbed out on a limb, sawed the limb off then fell with it.

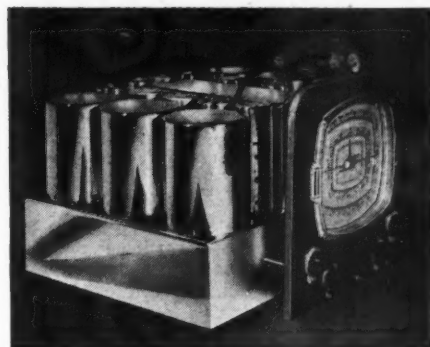
At the end of the item, the columnist laughed ever so slightly.

The victim of the incident happened to be listening in. He still could see nothing funny about it, so he hailed the Broadway-

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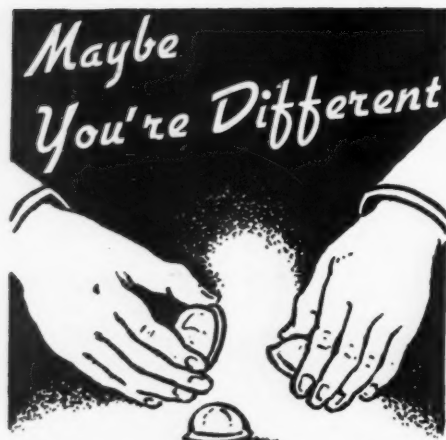
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ite into court on a slander charge.

After a few days, the jury also laughed. Winchell walked out of court with his pocketbook intact.

Incidentally Walter is not the usual type of newscaster. More and more he has turned towards the Pepys type. His notes are original and obtained, for the most part from unimpeachable sources. Contrary to belief, he does not employ any agents, assistants or ghost writers. Often the "scoops" are handed him by the persons themselves, for his circle of acquaintances is vast and wide.

And so it goes, day in and day out. To my mind there is not any game half as fascinating as that of the newscaster. Later and with practice he develops the ability of forming opinions for his listeners. Then he arrives at the pinnacle, when the commentator knows that he is a power in forming public opinion. If he holds this power in trust for the good he can do, he will be the greater for it, but if he lets petty bickerings and small feelings enter at that time, then truly has he worked in vain. For no matter how hard the way up has been, the slide down to oblivion will be lightning fast, for the most part painless, but final.

—30—

Airline Radiomen

(Continued from page 35)

fields surrounding Chicago, which had been open while I was in flight, had closed in solid with ground fog before I could have arrived there on schedule. After remaining at Fort Wayne for a while, the Chicago operator advised that local conditions had improved sufficiently for us to resume our flight to Chicago with safety, and we came in OK."

While the radio operator at Chicago had performed a splendid act of duty in his informing the pilot of conditions in advance, and without a doubt deserved a commendation from the company, his act was in the line of duty. It exemplifies the type of training that is required of all airline radio operators. This is the type of action that has elevated the operators occupation to what it represents in the air transport field. An airline radio operator is employed as much for his practical knowledge of the conditions surrounding operations as for his ability to transmit and receive messages.

Operators with radio experience alone are of little value to an airline until they have acquired a general knowledge of airline operations. Pilots place confidence in the operators who can anticipate their needs and supply them with the necessary information before it is needed. Likewise, radio operators soon learn the individual needs of pilots and when they desire certain information. An operator learns the local conditions surrounding the station where he is based.

With a basic knowledge of meteorology, he learns the significance of different clouds which appear on the horizon and estimates the resulting climatic condition by watching the movement and progress of the approaching clouds.

The communications department of Transcontinental & Western Air, Inc., is a highly specialized department organized in three divisions. One division takes care of all radio maintenance for the system. This department employs radio technicians with a practical knowledge of aircraft radio apparatus in the planes and the ground stations. These men are not radio engineers but are capable of keeping the company's radio equipment in good working condition at all times. This department is operated under the supervision of the maintenance department and does all the repair and overhaul work on the radio equipment of this company.

The radio engineering division of the Communications Department employs radio men with an engineering degree who are graduates of reputable engineering schools. These men design new equipment, and conduct experiments with radio apparatus having to do with blind landings, radio compass equipment and other airline radio developments. The building of new radio equipment is done in this department under the direct supervision of the Director of Communications for the company. This department also issues instructions to the radio maintenance department on methods of maintenance of the company's plane and ground radio apparatus.

The third section of the radio department is the operation of apparatus in conducting airline operations. Members of this department are located at each TWA field in sufficient number to take care of three shifts for day and night operations. These operators must have at least a second class radio telephone license issued by the Federal Communications Commission. They have a general knowledge of airline dispatching, meteorology, navigation, and some flying experience or an appreciation of flying in order to perform their duties with efficiency.

Encouraged in making trips over the region in which they operate, they should see the emergency fields in order to have a better conception of their sector of the airway.

To the amateur or the licensed operator who wishes to become an airline radio operator we recommend that he prepare himself for such a position by making a study of airline operations, and such subjects as meteorology and navigation. While flying experience is not necessary it is encouraged.

—30—

(Continued from page 53)

The high voltage power supply consists of a transformer which delivers 1825 volts a.c. each side of center-tap at 200 mils. However, the voltage, when rectified and filtered, is 1100 volts d.c. The rectifier tubes are Taylor 866-Jr.'s and will give excellent service. The T-40 will only draw about 125 mils when fully loaded and rectifiers will not break down.

A bleeder of about 20,000 ohms resistance, 150 watts rating, should be connected across the output of this supply.

The power outlets are terminated at the rear of the chassis to two sockets; one four prong for low voltage and the five prong for the high voltage.

On the front of the panel may be seen three switches. The purpose of one of these has already been explained. The second one controls the primary of the transformer supplying filament voltage to the T-40. (Both this transformer and the one for the '66-J's are under the chassis.) The third switch controls the primary of the large plate transformer. The location of all parts may be seen from the photographs. In the low-voltage supply the power leads may be cabled. However, this is not advisable in the high power unit and all high tension wires should be left in the open to minimize the possibility of arcing over.

(Continued from page 19)

"That is why it is absolutely necessary for the engineers to take all of the bugs out of television before sets are put on the market. And in this respect the government, the manufacturers and the broadcasting systems are standing firmly together to prevent the public from losing money. The television experiments which will continue to go on won't be paid for out of their pockets.

"When television does get out of the experimental stage and starts going into the home, no one can predict how rapidly it will spread. My belief is that it won't be too sudden. When it does start, however, we'll be ready for it from a program angle and that is where my work as director of television programs comes in. And that

"To begin with, I am absolutely convinced that Americans won't stand for any second rate or amateurish programs simply because they are a novelty. The newness of television will wear off very rapidly and the program offerings will be of the highest calibre consistent with the medium being used.

"Right now all of us are preparing to make it good when it does come. We haven't been premature here in America as they have been in England where they have a couple of thousand sets in operation and are referring to television as a 'British Art.'

"They have the sets and they still have the 'bugs.' When America starts buying television sets for its homes, it will be able to do so with the knowledge that the 'bugs' which give our cousins across the big pond headaches have been ironed out as far as we are concerned."

(Continued from page 26)

The versatile instrument also aids in locating "go-devils," current-borne devices sent through sewers and pipelines to clean them. A metalloscope, fitted into a torpedo-shaped watertight case, is attached to the go-devil and follows it until halted by an obstruction. With the aid of a second instrument the pipeline can be followed from above until a telltale buzz spots the halted go-devil and shows where to dig up the pipe.

Treasure hunters in various parts of the world have used the metalloscope with varied success. Recently an Arizona man with its aid located a buried adobe smelter buried years before by Mexican settlers and containing \$14,000 in gold, silver and copper bullion. Another found \$10,000 worth of currency buried in an old metal bean pot. Still another located \$900 worth of gold and silver coins in an old jug.

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Kodachromes mounted in glass frame suitable for cover, packed securely. Mail to editor Radio News.

Letters to the Editor

(Continued from page 36)

I received my issue of the RADIO NEWS yesterday. What happened to the practical lessons on Television by Sprayberry? Are more lessons to follow or will they be discontinued? I think it one of the most important and interesting sections of the NEWS. Let's have more lessons on Television.

—George E. Bean,
Stillwell, Okla.

(If sufficient of the readers want this feature, it will be returned. Ed.)

What's the idea of cheapening the RADIO NEWS! !!!!! Why so much trashy gossip? About half of that much would do. Why so much ballyhoo? The magazine is too much like burlesque—I've been reading RADIO NEWS for four years and did not complain until now. . . . Most readers of RADIO NEWS don't want "Gossip." P. S.—They can get it from daily newspapers. I suggest you use the extra pages for your cheap features but have the other sixty odd as they were. . . . I am repeating this because you appear quite stupid. Until all this is done you can again call RADIO NEWS "The Leading Mag. in Radio." Above all don't disband the Listening Post Observers and print more technical or semi-technical features.

—J. Andrews,
Winnipeg, Man., Canada.

(Our articles are to be as varied as is radio; with special emphasis on the "ham's" participation and technical contributions to the industry. If a majority of readers want L.P.O. back, they will be reinstated. Ed.)

Congratulations on the swell job you did on RADIO NEWS. Hope the magazine continues to get bigger and better.

—Hal Tate,
Broadcast Advertising, Chicago.

I am firmly convinced that you deserve commendation on the beautiful issue of RADIO NEWS. In my opinion, the first issue of the magazine as published by the Ziff-Davis Publishing Company, under your management far excels any of the previous issues.

I believe that it has definitely established RADIO NEWS on a much higher plane than it has heretofore enjoyed. I sincerely hope that through the years your influence will be as obvious as it appears in this particular issue. Best of luck.

—Jerome Kahn,
President Standard Transformer Corp., Chicago.

In reading the April issue of RADIO NEWS, one cannot help but notice the vast improvement in this magazine. The articles cover a wide range of events, as well as the technicalities of radio.

The construction of the magazine is such that the writer has read this issue from cover to cover; something which this magazine has never urged the writer to do in the past fourteen years.

Therefore, I am taking this opportunity to express my feelings on a job well done by yourself and associates.

—Louis J. Gamache,
Development Engineer, Chicago.
(To Mr. Gamache, who is an engineer of note, our thanks for this nice letter. Ed.)

Your new issue of RADIO NEWS received and consumed. I believe that congratulations are in order, you have a splendid publication, instructive and entertaining, is a mild way of describing it.

I have always thought that a publication could fill the "gap" between radio servicing and commercial broadcasting, the latter of which, I am now interested; and I believe that you have done and are doing just that.

—C. S. Fletcher,
Serviceman, Gainesville, Tex.
(We are trying to fill that gap, Mr. Fletcher. Ed.)

Scott's Receiver

(Continued from page 28)

on, the other to elect the channel.

An auxiliary timing cam attached to the clock, making one revolution each quarter hour, touches off two switch contacts, thereby completing a circuit which sets the motor in action to make the switch to the next pre-selected station. This circuit is made exactly at the 60 second mark at the 15 minute intervals. The contact remains for five seconds—ample time to move from

one end of the broadcasting band to the other. Then the cam passes into a position enabling one of the contacts to fall away from the other, thereby interrupting the circuit and again bringing in the sound—now from a new station.

Using the clock day by day is simple enough. In the morning—or afternoon—the listener consults his favorite radio listing medium, checks the programs he wishes to hear, noting the stations. Then he selects the pins, corresponding to each station, inserts them for succeeding hours, these being designated on the ring from 1 to 12 o'clock on a semicircle, then being repeated in order on the second semi-circle.

It takes only a few minutes to set up the whole schedule for the day. For the weekdays many daytime listeners will find that comparatively few changes are necessary, the same programs often running at the same hours and on the same stations from Monday through Fridays or Saturdays. Thus no woman need miss any installments of her favorite serial.

The Scott Telematic, using 14 tubes, is said to be of such advanced design that no circuit wiring diagram or detailed description of the mechanical details will be published until several patent applications have been filed. One new feature incorporates a negative temperature coefficient circuit offsetting drift, which keeps the oscillator frequency constant within a fraction of a kilocycle at any frequency at which it may be tuned—regardless of temperature of the receiver or the room in which it is operated.

The frequency response of the newest 1938 receiver extends from 30 to 16,000 cycles. Certain portions of the range may be attenuated by adjustments of bass and high fidelity controls on the chassis. Maximum power is obtained with less than 2 per cent distortion, it is said.

The person who has apparently solved the one last barrier, enabling robot tuning—and a 24 hour advance setting, is E. H. Scott of Chicago. The set is known as the New Telematic Radio, and is one of a long line of radios brought out by this "ahead-of-his-day" manufacturer.

—30—

OOPS! SO SORRY!

In the April issue we showed two grid condensers in the 803 circuits on page 45 on the wrong side of their respective RFC chokes. They should appear in the same line, but on the RK48 side of the junction of the RFC grid choke and the grid connection. Also the keying circuit should be changed so that the key breaks the ground connection. To Mr. Gustafson, our apologies!

On page 41, the grid return resistor of the last 6K7 was omitted. To Mr. Frank Jones, our apologies!

On page 39, the cathode shown in the 1C6 should be a grid; C9 should be in series with other condenser. To Mr. Lloyd Moore, our sincere apologies!

To the many readers who called our attention to these inadvertent errors, many thanks.

Akron's LSO

(Continued from page 38)

rooms removed from him.

The story is related, with chuckles, at this building, of how the patrolman on the beat was passing by one morning and heard the strains of "America, the Beautiful," issuing from a room on one side of the building. As he rounded the block on another side of the same building, he heard the song again, being sung in exact time with the song he had heard on the first side. Proceeding to the third side and then the fourth side of the big structure, he again heard the strains of "America, the Beautiful."

Puzzled, he rushed into the janitor. "Do you mean to say that you have a piano in every room in these hard times, and how the deuce do the teachers all keep in time?" asked the bewildered cop.

Another Akron school where the radio is installed, reported that the radio was left on by mistake in the principal's office and that the chastisement of a small boy was graphically relayed to each room in this fashion.

Aside from these small slips, the address system has proved of immense value.

"Even truancy has been reduced by announcing sporting events results, and putting the World Series reports on in school hours. In the old days the boys would all play hooky on World Series' days and we would find them down at the corner pool-rooms listening to the returns. Now they all come to school to hear them."

"Station LSO" is a name selected by the children themselves who wanted to have their school radio sound professional. The initials stand for, "Lincoln School Office."

At present nine schools in the Akron district have these inter-classroom radios and regular radio lesson periods.

-50-

30 Watts of Audio

(Continued from page 45)

rise higher. The gain of the amplifier at low levels is not affected. When picking up speech on a microphone, the usual volume control is opened up to get normal pickup at the desired distance—say, three feet. The AVL control is set to give the maximum desired level and entails very few extra parts in the construction of an amplifier.

The amplifier associated with the AVL has a distortion less than 4%. Two 6L6 tubes are used in the output stage, but they are not pushed hard enough to draw grid current. A small triode, a 6C5, suffices as driver, and high power, high overall gain, and a minimum of tubes combine in the design. Two input tubes are provided, 6K7's, having mixing controls and with resistance coupling to the 6C5 input. A separate power supply is utilized for the amplifier, connection being made by plug and cable. The separation between the two units tends toward a lower overall hum level. Power requirement is 6.3 volts, 3 amperes for the filaments, and 130 milliamperes at 400 to 450 volts plate supply.

When using an input transformer, magnetic phonograph pickup, or similar unit it is necessary to have the blocking condenser C_1 in series with the input; otherwise, part of the bias on the 6K7 tubes would be shorted out. This condenser C_1 is unnecessary if the input device has no internal d.c. path—a crystal microphone or pickup, for instance.

A 1-V rectifier tube operates in the AVL portion of the circuit. The actuating voltage derives from a 500-ohm winding of the output transformer T_1 . This may be the winding feeding a line to loudspeakers or modulators, provided it is ungrounded. Otherwise, the transformer T_1 must have a 500-ohm secondary additional and separate from the winding which feeds the load; or, an entirely separate output transformer of very low power rating can be connected to feed the AVL circuit.

The audio voltage is rectified in the 1-V tube and led back through a filter and delay circuit as bias to the 6K7 input amplifiers. In view of the relatively low-level input, and by proper choice of operating voltages, the 6K7 tubes introduce negligible distortion even when their gain is varied over wide limits by means of the grid bias. The 250,000-ohm potentiometer, R_{12} , is the limit control. It introduces a d.c. delay voltage so that the AVL action does not start until the audio level rises above the voltage setting. A toggle switch is provided to short out the AVL bias. When the switch contacts are open, the AVL is active; when closed, straight amplification without AVL is had.

In adjusting the system, cut off the AVL by means of the switch and check for correct operation as a normal power amplifier. Turn the knob on the limit-control potentiometer to put the contact at the grounded end. With tone or steady voice input open up the gain on the regular volume control till full power output results. A high-resistance d.c. voltmeter (1 megohm internal resistance or higher) should measure 15 to 25 volts across R_6 . Then put on the AVL with the switch, and slowly open the limit control R_{12} until the desired volume level is reached. Thereafter, the AVL will prevent this volume level being exceeded. The amplifier can be faded from one input to another, or the two inputs can be mixed in usual fashion by manipulation of the R_1 volume controls.

The amplifier is assembled on a 2 by 6 by 16 inch chassis. Other constructional details will be apparent from the photographs. The two input connections shown are made from automobile fittings, single-contact bayonet-type sockets, and are used with companion male fittings on the input cables. The single contact connects to a 1-wire shielded cable and the socket shell goes to chassis ground and cable shield. The four leads to the power supply, and the two from the amplifier output terminate on a 6-prong wafer socket into which the connector plug is inserted.

Construction is simple and orthodox and no particular trouble should be experienced. Users of AVL systems of modulation, both amateur and professional, report considerable increase in the received signal. Its use by "hams" should be appreciated, if for this reason only.

-50-

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Within Earshot of the Editor

(Continued from page 4)

station in the United States, being farther west than KXRO or KIEM, who previously claimed that honor. This farthest west station is located at Marshfield, Oregon.

* * *

IT seems a pity that actress-mimic Sheila Barrett and movie screen-radio star Luise Rainer both have to use the same script. We first heard Sheila Barrett using the "telephone script" as it is called, and shortly thereafter we heard Luise Rainer doing the same monolog. Apparently there are not enough scripts to go around. This should be an encouragement to those who wish to write for radio. An article on how to do this will shortly appear here. Watch for it.

* * *

ASIDE to Rudy Vallee: Please, Rudy, for the sake of those who like you, do not force any more of those English stars and their English humor upon us. Somehow or other, they never seem to "click." With so much good U. S. A. talent clamoring at the gates of Radio, can't you find some new, refreshing native talent for your otherwise excellent program?

While we're on the subject, can't something be done about the applause which breaks into the middle of most of the popular swing bands' numbers as well as some of the classical orchestrations? We know that the artists like to have the studio audience applaud, but we wish that both the studio audience, the artists and the control room would realize that the people on the air are unable to hear the artists because of the racket. We experience nothing more annoying than to have the middle of a program interrupted by the handclapping that overrides all other sounds.

* * *

WORD reaches us that NBC will not let any of its engineers write anything for publication, no matter what. It is said that the venerable company is afraid that the engineers will reveal secrets. Sufficient to say that most of the things that the engineers use on the networks have been revealed not only from the patent office, but

also by most contemporary engineering literature. Why deprive the engineers of the small extra remuneration they might receive from writing a few articles which would not even remotely concern themselves with station technical activities?

* * *

RAISED Eyebrow Department: How fleeting is fame! On February 10 in the *NBC News* a gorgeous picture of one Lola Marlo, actress, appeared. When we called NBC on February 11 requesting the use of Miss Marlo's picture for a possible cover we were informed on February 12 that Miss Marlo was no longer with NBC. Marlo's engagement was apparently very limited.

* * *

STATISTICS Department: Recently a survey was made concerning that Mae West skit which broke into print. According to *Radio Guide*, of the listeners who actually heard the Adam & Eve skit, 59% approved and 41% disapproved. Of the 59% that approved the most, or 56% were church people, while of the 41% that disapproved, only 50% attended church. Furthermore, of the group that did not hear the West act, represented by 28% of all the people answering the inquiry, 57% disapproved (and of these 67% went to church), while the balance of 43% did approve. How can they disapprove when they didn't hear the act?

More statistics: In New York City all radio announcers and stars must wear evening clothes for their evening performance. If this is what happens now, what will they wear for television?

* * *

IN this issue we have an article on an audio oscillator. At first glance there does not seem to be anything unusual about it, but when recently we were practicing the profession of radio engineering, we needed a circuit for one. It seemed that a hook-up of this particular unit just wasn't. And so it is with a great deal of pride that we present the diagram and construction article. When purchased, ready-built, an audio oscillator would cost from \$100 upward. The parts are comparatively cheap and almost any amateur or serviceman should, from the information contained in the article, be able to build his own beat frequency oscillator.

* * *

COMING Events Department: We expect to have a story on the "Man Behind the Joke." Also, what happened when the men who write the jokes actually tell them.

Soon we will feature an article on "how to get an audition" and "what not to do at the audition."

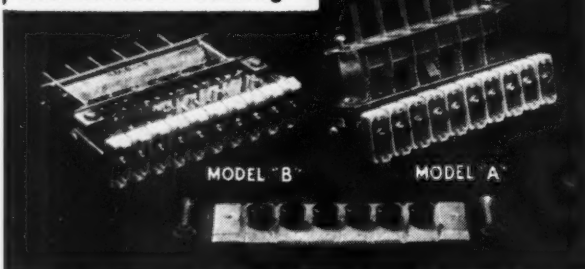
The United States Government has kindly consented to our use of their material on facts of aviation radio as furnished to the flyer by Uncle Sam.

In the "Ham Department" we expect to run a number of constructional articles on the latest tubes and circuits. One in prep-

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* * *

SCOOP Department: U. A. Sanabria, eminent vice-president of the American Television Institute and brilliant engineer, will shortly go before the F. C. C. in Washington with a proposal which will give the United States television within a year. Our hats are off to Mr. Sanabria for his unique achievement and the efficient plan which he revealed to us the other day. We wish him luck, because only with such a plan can we have television coast to coast, at once.

* * *

LEGAL Department: We are in receipt of hundreds of letters every month requesting hook-ups and information on transmitters of very, very low power. These letters are written obviously by persons who intend to use the transmitters and unfortunately they are not familiar with the law.

A Federal license must be obtained by every person or company using a transmitter no matter how short the range. If in doubt, consult with the local Radio Inspector in your district or write to the Federal Communications Commission in Washington.

Under no circumstances transmit or put a transmitter on the air without a license. Many persons have run afoul of Uncle Sam by sending some small minute program over the air for their own amusement. We write this in all sincerity, in a spirit of helpfulness to our readers.

* * *

A VIOLENT controversy has arisen in the editorial staff of RADIO NEWS; and we are about to throw the whole matter into the laps of our readers. We should like to have letters describing exactly the kind of a cover you should like to see on this book. Personally, we have no preference. There are those who would prefer a technical cover, and others the girl stars. In any event, we would appreciate your comment and your vote. From month to month we will tabulate these and report.

While we are about it, we will be happy to purchase at our usual rates any Kodachrome shots which would be suitable for a cover. Kindly do not mail them to us except in the most carefully constructed packages. If rejected, they will be promptly returned, and although we cannot be responsible for them after they leave our hands, we will take the greatest of care.

* * *

WE are in receipt of a letter from Goodwin L. Dosland, Chairman of the Chicago Area Radio Club Council in which "Doc" Dosland takes us to task for saying that the next A.R.R.L. Convention will be held in Chicago. He says that it has not been voted on yet, and that we are meanies to say what we did.

Far be it from us to tangle with the member of the bar that "Doc" is, but—we got the dope directly from him, and further from the official magazine of the very council of which he is chairman.

He writes that he knows of "no battle between the Westerners and the Easterners" in A.R.R.L. Well, two things are cer-

tainly true—firstly, he knows it now! and secondly, this is but the usual hush-hush tactics adopted by the A.R.R.L., its delegates and affiliates to keep from the public as well as its members, the serious dissension within its own ranks. As a reporter, we promise to keep our readers informed on this very interesting subject.

* * *

WE are in receipt of a letter from A. L. Budlong, Acting Secretary of the American Radio Relay League in which he takes us to task for our words anent the Chicago Convention mentioned in last month's column. He also says that we were not telling the truth about the "steam roller tactics" we mentioned. Well, far be it from us to act unfairly in the matter. If we are wrong we will say so.

While this is not usually liked by the A.R.R.L., we believe that the matter had best be settled by the readers themselves. **IS THE MEMBERSHIP OF ALL THE LICENSED AMATEURS SATISFIED WITH CONDITIONS AT HEAD-QUARTERS?** We cordially invite each faction to present its side in writing . . . come one, come all! If you have anything to say on the subject write it in and we promise faithfully to report the results.

Personally, we have nothing against the A.R.R.L. except that its method of representing the members at headquarters is, in our opinion, not the best form of self-government. We are not in open warfare against it nor any other organization, but we dedicate our book to an open forum on

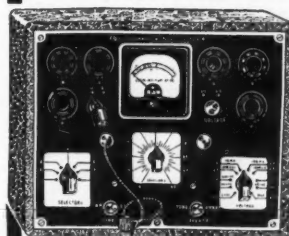
that question as well as any others which might be of national importance.

* * *

AND so somehow another column has written itself. We hope that we are getting at what the reader likes. If we have fallen short we trust you will not be backward in writing us. It is the aim of RADIO NEWS and its editorial staff to please the greatest number of our readers at all times. So, until next month, so long and 73.

-30-

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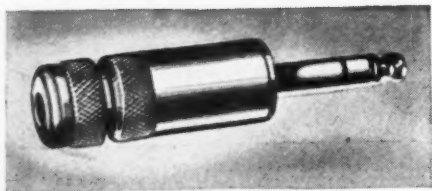
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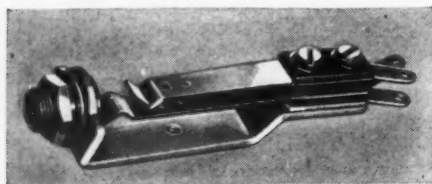
Model 431 same as 430 except has Readrite (GOOD-BAD) meter

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No. 1 Ham

(Continued from page 31)

on a sealer in the Arctic when he climbed down the ship's ladder and walked over 14 miles of ice and wastes to see an Eskimo girl “wrapped in burlap.” And of the night in a Haitian government land station when he was warned not to venture out of doors. “Big shoot, boom, boom, no go out tonight,” was his warning. Sure enough, shots resounded throughout the mountains shortly after sundown, bullets eventually splattered off the walls of Vermilya's wireless shack and when, by morning, things had quieted down, Vermilya answered a knock at his door to be confronted by a much be-medaled “admiral” and his bodyguard. “Me you new boss . . . me run government now,” the admiral said. The government had changed hands overnight.

At another time, Vermilya, sitting idly in his land station, was trying to decipher the messages of a Chinese boat in the harbor. Scarcely thinking, he tapped out the words “No Tickee, No Shirtee.” International complications resulted when the Chinese boat officers reported to the Chinese consul and the State Department reprimanded Vermilya. About this time, Vermilya was changing over from the American Morse code then being used to the more universal International code in use today.

We forgot to inquire, but probably everything on the sea became too plebeian after serving on a millionaire's luxurious steam yacht and when the voyage ended he quit the merchant marine. This palatial castle of the seas, the privately owned yacht, *Emaline*, was outfitted with a complete wireless outfit, Hawaiian singers and entertainers, electric searchlight, electric chimes and bells, piano, organ, movie projector, gattling gun, and perfume fountain . . . and, remember, all this in 1912.

After leaving the sea, Vermilya was assigned to wireless stations at Sagaponac, L. I., Seagate, Coney Island, and general manager of the high power press station WCC at Wellfleet, Mass. Up to this time, Vermilya had worked for one company only. That is—he was assigned his various jobs by the United Wireless Co., which later became the DeForest Telegraph Co., then the Marconi Telegraph Co., and today we find it under the name of the Radio Corporation of America.

In 1912, the government began licensing wireless operators. Vermilya received “Certificate of Skill” number 1, or license number 1 from the Brooklyn Navy Yard. The title of “Number 1 Amateur” was bestowed upon him by A.R.R.L. of which organization Vermilya served as New England Division Manager in 1921.

Following two years' service in the Navy during the war, we pick up our Number 1 Ham serving the RCA commercial wireless station at Marion, Mass. Here the 14 four-hundred foot antennas were sending out so much “soup” that Vermilya frequently took his friends out under the antenna and, wearing rubbers so he wouldn't be grounded, caused tiny sparks to jump from his body to that of a com-

panion. He could read messages being sent by this method, too. He likes to tell of the flivver truck load of iron pipe that drove in one day and stopped under the antenna.

“The tires of the truck kept it from grounding, so when the driver stepped from the running board to the ground, he got a shock. Well, he leaped and broke the contact. When he put his hands on the iron pipe to unload, he made another ground and got another shock. By this time he was pretty sore and decided to drive out in a hurry, but when he touched the crank we had to stop sending until he unloaded his pipe.”

In 1921, radio began to blossom forth. Vermilya accepted a post in the radio division of Slocum & Kilbourn in New Bedford, Mass. He built the eleventh commercial broadcasting station in the country, WDAU, which has been operating continuously ever since. In 1923, he bought the station and moved it to Mattapoisett, Mass., operating under the call of WBBG; in 1925 he moved to the New Bedford Hotel and continued operation under the call of WNBH under which the station is now operating. In 1934, for a handsome sum, Vermilya sold out to the local newspaper and is now serving as general manager of WNBH and the 100 watt ultra short wave station WIXEQ. He also owns, and rents to New Bedford and Fairhaven, the 100 watt police transmitter WPFN. That's his business, his hobby is—radio.

At Vermilya's home in Mattapoisett, he operates his ham station W1ZE, known to hams throughout the world. You can't miss it, because his 175 foot antenna mast towers over the town, and his one kilowatt signal dominates the band. He works one kilowatt transmitters on 160 meters phone and CW, 75 meter phone, 80 meter CW, 40 meter CW, 20 meter phone, and 5 meter phone. In the back of his coupe, you'll find a 30 watt portable 5 meter transmitter, all crystal controlled.

At 7:30, morning or evening, the chances are good that you'll find Vermilya on the 160 meter band at his favorite pastime of talking to various members of the “Farmers Network,” a name given themselves by about 25 hams in New England only.

Like most amateurs, Vermilya has had his share of electric shocks. The worst came two years ago when, as he says, “I'm old enough to know better.” He took 1500 volts that slammed him against the wall, made a hole in the plaster, but failed to knock him unconscious, though he felt it for days after. You can't keep a good man down.

As in 1901, Irving Vermilya, now 47, is still pioneering in new ways for the transmission of messages. During the past two years he has been experimenting with transmissions using neither wires nor radio. To date, he has heard his watch ticking five miles away. And when the government starts issuing licenses for this new method, you'll probably find that Irving Vermilya is still Number 1 Ham.

Dear Joe:

(Continued from page 54)

got so homesick he didn't know what to do, especially since his gal was going on the same trip . . . so he stowed away . . . they caught two others out to sea before they caught him. At San Juan we were standing around and we saw this guy take off his overalls, poise himself and dive off. The army got him, though, and sent him back to Panama . . . *muy pronto*.

But that is off the story. . . . In San Juan I am in the Post Office and the darn thing starts to waver and all that sort of thing. . . . Wasn't bad enough to be seasick . . . but now I have to be land sick to boot. We make a few more of the towns of the island and the more of them you see the more disappointed you become. They certainly are miserable places on the whole. Even though I feel I will be the same going back as coming down, I am anxious to get back . . . shows you how foolish I am . . . eh, Joe? Some of the towns are so poor you can't even buy a banana in them. . . . And with all the nice climate and surrounding ocean there are no beaches to visit. That is the last straw and sure discourages me . . . no beaches in Porto Rico. . . . There is one little mudhole in a place called Ponce, but you have to be in with the crew to find it . . . so I get in with one of them and he takes me over to it. It is about the size of two bathtubs . . . something they never see down this way and which they wouldn't miss if they saw them . . . judging by the various odors wafted about by the questionably sweet breezes.

In this swimming hole you get wet, but you get as full of sand as you get wet and the swim is not much good. When we return to San Juan I take a swim in the pool there . . . seems there is a beach connected to the pool, but no one ever uses it on account of fear of sharks . . . having seen a few of them, I fear them, too, and stay in the pool.

Well, Joe, we are just about getting ready to sail from here now . . . another hour or so and we'll be off. I did find out one thing, though . . . that stewards on ships, that is, the chief steward, is sure tight . . . with that I found out that Bologna is bad for sick people . . . and I wonder if he didn't feed me that stuff to keep me that way and save on the food . . . sure they do it

But, Joe, I can't help wondering about the chief. It seems that everything he can do well . . . that is, to make a living . . . ties up with the sea . . . he has a master's license and engineer's, too, but the poor guy gets seasick all the time . . . seems he has about everything taken out of him now that would cause that . . . or so they say . . . and then he had his teeth all out . . . but he still gets deathly sick as evidenced on this last trip . . . so I wonder what he can have taken out now . . . do you think it could be the stomach? I have to mail this now, Joe, so . . . so long.

73

MACK.

Not for Rebroadcast

(Continued from page 8)

MAESTRO TOSCANINI'S intense dislike for Nazis and Fascists will cause him to shun his native Austria, this Summer, while touring Europe. . . . Already on the fiery little conductor's blacklist are Oberammergau, Milan, the Danubian Wagner shrines—and now Salzburg!

Only a great lover of music can appreciate what a sacrifice it is to turn one's back on such music centers.

This column has it on good authority

that Toscanini has even considered establishing residence in the United States!

* * *

NBC has rescinded the ban on Fibber McGee's "Goodnight, Molly!" on grounds Fibber is addressing no actual person but a character—therefore the closing is not point-to-point or personal in character. . . . Molly (Marian Jordan), meanwhile, is still in a sanatorium. (She is around 40 years old, which answers questions relating to age, etc.)

The ban on singer John Charles Thomas' "Goodnight, Mother" still stands because the net ruled it IS person-to-person in nature.

-30-

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Microphone Manners

(Continued from page 13)

accounts for the few gray hairs that are already sprouting from my youthful head. Jane Pickens arrived two minutes before we were due to go on the air. I must have lost ten years of my life waiting for her.

Miss Pickens was to sing a song in addition to being interviewed. Her late arrival made it impossible for us to rehearse our program. The musicians did excellent work in playing the accompaniment while Miss Pickens led the orchestra as if she were an experienced conductor. [Most singers lead the orchestra, to the chagrin of the orchestra leaders. Ed.] She read her lines with the greatest of ease and seemed calm and collected. She gave a better performance than do most dramatic actresses who have had the benefit of two or three rehearsals. Since that experience, I always ask my guest stars to meet me a half hour earlier than is really necessary.

Just as some people are late, others are always early. I don't think Roland Young has ever been late for an appointment. He is a prompt and reliable gentleman—the kind you read about in books. Having completed the rehearsal, Mr. Young amused the studio personnel with stories. I mentioned we might run short of copy and asked Mr. Young to tell one of his funny stories on the air in that event. He agreed. We waited for the light to flash. We were on the air. The interview went along at a great rate. We came to the last line sooner than I had expected. Remembering Roland Young had promised to tell a story, I said: “And how about that anecdote you were going to tell?”

“You've heard it,” said Mr. Young rising from his chair. “You tell it. I'm going out to smoke a cigarette.”

And he made a leisurely exit from the studio to the reception room.

I was panic stricken. I talked at random vaguely remembering the story. Finally, the door opened, Mr. Young entered and seated himself before the microphone.

“That was pretty good,” he said. “You go and smoke now. I'll hold the fort.”

Although I have made a lot of friends through interviews I frequently lose them also. For instance, some months ago I sold Frank Lawton the idea of answering questions for me. Frank arrived at the studio and couldn't wait to start rehearsal. He wanted the program to be letter perfect and he was very nervous about it. After a half hour rehearsal we thought we were ship-shape. And we were—until we ran

out of copy. Frank became unduly excited at this point. Then I realized I too, was upset. So I asked one of those age old questions interviewers have been asking movie stars since the birth of the cinema. “How does it feel to see yourself on the screen?”

“Terrible,” he replied. “I can't ever get myself to believe I really look that dreadful.”

“Oh—but you shouldn't feel that way. I think the movies flatter you. You're not so good looking offstage!”

Mr. Lawton made some reply to that. I still don't know what; I was much too embarrassed. Then I corrected that he really wasn't at all handsome. I'm sure Evelyn Laye, Frank's wife, who was listening-in will never talk to me.

Frank was one of these boys who adhered rigidly to the script, but there are others who follow it word for word only when rehearsing. Richard Whorf used to drink beer night after night in his royal box at the Guild Theatre. (He was appearing as Christopher Sly in the “Taming of the Shrew.”) When I asked him what he would like to say about the role he was playing, he looked squarely at the mike, raised his voice ever so slightly and murmured, “My part necessitates drinking at least four bottles of beer each night. Hence, this is by all odds the best job I've ever had.”

Ray Bolger is another boy who pulled a fast one on the air. We read our script and Ray said he was very pleased with what I had written. It was swell. Incidentally, these chats are supposed to sound informal and scriptless. Everything went along smoothly until Ray came to the word “sarcophagus” . . . “Say, how do you pronounce that?” he asked. “And what does it mean, Charlotte, you wrote the script?”

I assured him I had stolen not only the word but the entire line right from the theatre program. Ray then decided he would rather dance than be interviewed. He turned to the orchestra and suggested a tune. A production man miraculously appeared with a tap board. In a couple of minutes we continued with the interview—after Ray stopped dancing.

Ray, in addition to being an ad-libber is an eye rubber. Ernest Truex didn't dance before the microphone, but he might just as well have. He's always doing something that resembles the “Big Apple” when there's a microphone in sight. Ruth Weston is a handkerchief ripper, and Walter Pidgeon is an inveterate apple eater. Grant Mitchell is a paper rattler instead of a coiffeur fixer upper like Gladys George.

All of which adds up to this: Microphones have a strange effect on people's manners!

Short Wave Propaganda

(Continued from page 15)

tant and far off affair to most American listeners with their devotion to Charlie McCarthy, Rudy Vallee and Bing Crosby. But at the same hours their favorites are on the broadcasting band the seductive offerings of Hitler are filtering into our homes by short wave and the number who listens is increasing day by day as receivers are improved and reception of transmissions from abroad perfected.

Listeners have been organized, too, in America as well as elsewhere throughout the world. Pro-Nazi organizations hold regular listening parties at which communal attention to the voices of Hitler or his henchmen is mandatory. And many Americans of German descent tune in on the entertaining programs well interlarded with Nazi pap.

A most effective device are the Mail Box programs. Letters and contributions to the Nazi cause from Americans are acknowledged on various Mail Box hours throughout the week and personal messages exchanged between individuals in the Nazi homeland, and friends and relatives in America.

American tourists are regularly extended the privilege of talking to folks at home. Their remarks are, of course, rehearsed and censored lest any untoward remarks be made about Nazi-dom. The tourists usually point out that Germany does everything better than we do at home, that great strides forward are everywhere apparent. These mail boxes are packed with propaganda. Often it is as well sugar coated and as deceptively presented as the commercial advertising in our own sponsored programs.

Germany's tactics in newscasts in English are particularly irritating to the British. Not only do the Germans employ announcers with the same Oxford accents as the BBC announcers, but they follow British broadcasts on the air on channels just a hairsbreadth away from those of England. Thus at 7:40 p. m. (E.S.T.) England comes on at 11.75 megacycles; when they sign off at 8:15 Germany comes on at 11.77 giving a pro-Nazi colored interpretation of the day's events. Many a listener must be fooled into believing that he is hearing London.

This sort of strategy has angered Britain greatly. It has even been the subject of debate on the floor of the house of commons. The British propaganda committee is considering ways of retaliating.

A Berlin newscast, if heard from the beginning, is easily identified. It starts off with noting Hitler's activities for the day. The announcer seldom gets far before he gets in a plug for the dogma of the nation, or, for glorification of the doctrines of one or more of Der Fuehrers political bedfellows. This kilocyclic backscratching is one of the cardinal tenets of short wave propaganda campaigns.

Mussolini's visit to Berlin last fall offered an opportunity to see the propaganda machine operating in high gear. Leaning heavily on superlatives, the friends in fascism extolled one another, dwelling on

the glories of national socialism and picturing graphically the horrors of bolshevism.

Hitler's first words on this occasion touched on the radio aspects of the meeting.

"This demonstration," he pip-squeaked, "is being closely followed by the national communities of two countries, numbering 115 million persons, besides hundreds of millions in other parts of the world who are following the proceedings by radio."

Then followed accusations of "Democratic and Marxist International revels in demonstrations of hatred." This sort of thing filters into American homes today and every day.

"Everything that Germany and Italy have in common," roared Il Duce into the microphone when Hitler had finished, "is most clearly expressed in their joint struggle against bolshevism, the modern counterpart of the darkest Byzantine tyranny—that unparalleled exploitation of the trustfulness of the lower races, that regime of starvation, bloodshed and slavery."

"Since the war Fascism has fought against this scourge of humanity and the depression which it nourished . . . thus we have faith in Spain where thousands of Italian Fascist volunteers have fallen for the sake of Europe's culture, a culture which may yet see a revival if it will but turn a deaf ear on the false prophets of Geneva and Rome."

"Comrades beyond the frontiers of our own countries, we like you, make no propa-

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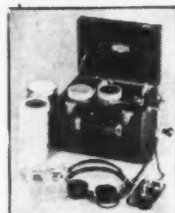
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ganda in the ordinary sense of the word in order to gain adherents. We believe that truth will finally conquer."

Propaganda—every bit of it!

Not long thereafter on the 15th anniversary of the "March on Rome" Mussolini put on just as big a whoopla at home. The whole business was put on the international airlines and rebroadcast at the dinner hour for the benefit of American listeners. Mussolini's bellowing on this occasion was supported by a terrific fanfare of fascist anthems, marches by blaring bands and vocal acclaim, with hundreds of thousands participating. The last raucous note had no more than reached the airways when Hitler's henchmen were at their own microphones with ecstatic compliments and an interpretation of Germany's part in the affair.

Recently, Hitler's voice yelled threats across Europe for two hours and forty minutes. Hitler slew imaginary dragons and challenged all comers. Following the broadcast, the whole Reichstag show was retransmitted in five languages with mighty repercussions and reverberations ringing around the world.

"With one country alone have we scorned to enter into relations," he belched. "That state is Soviet Russia. We see in bolshevism more now than before the incarnation of human destructive forces.

"I believe a Japanese defeat in the Far East would never be any good to Europe or America, but would exclusively benefit bolshevist Soviet Russia," he admonished.

"I do not consider China mentally or materially strong enough to resist any bolshevik attack on it, but I believe even the greatest victory for Japan would be infinitely less dangerous to the culture and general peace of the world than a Bolshevik victory would be."

All of which is neither true nor possible.

From Moscow one gets from 7 to 8 p. m. (E.S.T.), in English, quite another story. Stalin is now the hero, Hitler, Mussolini & Co. the arch-fiends. Moscow devotes much of the day on its powerful shortwave station for attacking the policies and personalities of all other countries—in German, French, Czech, Spanish, Dutch and many other tongues. Two hours are devoted to exposing the wickedness of the Nazi tyrants and calling on German workers to revolt against them.

"The rotten foreign capitalists," listeners are told with monotonous repetitiousness, "the Fascist, reactionary, chauvinistic dictatorships are exploiting the workers of the world. In Germany, in Italy, in the Spain of Franco, in Bulgaria the working people have no rights of any kind."

Moscow, listeners are assured, is always on the side of oppressed peoples. Didn't Russia provide its citizens with the most liberal constitution in the world? Nothing was said, however, of the fact that there was only one candidate—the official Communist approved man for whom they could vote in each office.

The Moscow "news" periods are regularly interspersed with long and dull readings from the Marxist prophets. The news items are similar to those coming from other dictator ridden countries except that in Russia the triumph is all on the side of the anti-fascist ideologies. Examples:

"The Peoples Front the world over grows steadily stronger. . . . The Spanish Loyalists again have advanced their heroic struggle. . . . The Chinese again repulsed the Japanese in a fierce conflict. . . . The Japanese continue their bombing of defenseless towns, killing many workers, women and children. . . ."

Spain gives a striking example of the use of radio in wartime. The Loyalist government has had the advantage because in the transmitters of Madrid, Barcelona and Valencia they have had the biggest guns. The radio, in fact, has been the only means of communication over much of Spain during the civil war. It has even had the approval of the Vatican in broadcasting masses from the Franco side to the faithful on the Leftist side since no public worship is permitted there.

In their broadcasts each side grossly exaggerates so that it is impossible to discover the real truth.

"Believe us, this is the real truth," cried Seville, in the hands of the rebels, one evening, "do not believe what Madrid says. On all sides our armies are advancing. We have captured 12,000 prisoners. . . ."

Suddenly, in swelling volumes, came the Leftists' jamming from Madrid and swamped the Seville station completely.

The Spanish war even produced a Radio General, Queipo de Llano, commander of a Rightist Garrison. He was at the microphone so steadily that he had practically no time to command. Queipo used language, which if it had been English, would have shocked the English speaking world. Favorite stunt was to make shocking revelations concerning the private lives of the Madrid cabinet chiefs.

Of late the Rebels, having no high powered stations, have been relaying broadcasts by way of Salamanca to Tetuan, Morocco, and Teneriffe, Canary Islands, for the English speaking world, inviting them to "try to know the new Spain—the Spain of Franco."

Similar use of radio is being made by the Japanese and Chinese in the far eastern conflict.

As far as America is concerned, the problem of coping with propaganda on the air is in the lap of the listener. Deluged with conflicting arguments he must fight his own way to the truth.

We must maintain eternal vigilance lest we, too, be drawn into the international babel. There are forces at work to get the government actively in the broadcasting business. There is, for instance, the proposal by a senator that the Federal Communications Commission censor all material before it goes on the air. There is now a demand for a single nationally owned and operated broadcasting station. That might be just enough to get us into the radio propaganda race. Might it not foreshadow the end of our private system of broadcasting with its benefits for culture and commerce?

Observing how completely radio has become the pawn of governments in all but a few remaining democracies—should not the American listener be moved to guard more zealously the principle of free speech—lest one day our land of the free, too, may go the "dictator" way, and we lose our freedom?

Foreign Newscasts in English Received in U. S.
POLITICAL COMPLEXION OF NEWSCASTS

TIME E.S.T.	RIGHTIST	LEFTIST	INDEPENDENT
	Fascist Nazi Insurgent Spain Japanese	Communist Russia France Loyalist Spain Chinese	British Empire Little Entente France League of Nations Vatican
A.M.			
3:20			GSB (9.51)—London GSD (11.75) GSG (17.79) GSO (15.18) (British) VK3ME (9.50)— Melbourne (British) VK3LR (9.58)— Lyndhurst (British)
6:00 (ex. Sun.)			
7:30 (ex. Sun.)			
7:30		XGOX (9.8)	
7:45	JDY (9.925)	Nanking	
8:30	Tokio		GSG (17.79) GSH (21.47) GSO (15.18) (British) HVJ (15.12)— Vatican City (Cath- olic) GSF (15.14) GSG (17.79) GSH (21.47) GSD (11.75) (British) GSB (9.51) GSD (11.75) GSG (17.79) GSI (15.26) TFJ (12.235)— Reykjavik OLR4A (11.84)— Prague (Little Entente) TPA3 (11.885)—Paris GSB (9.51) GSF (15.14) GSP (15.31) GSO (15.18) (British)
8:00	JZJ (11.8)—Tokio		
10:15	JIB (10.535)—		
10:30	Tokio		
11:00			
NOON			
1:00 P.M.			
1:40 (Sun.)			
3:00			
3:10		TPA3 (11.885)—Paris	
4:00			
4:45	EA9AH (14.05)— Tetuan, Morocco		
5:40			HP5J (9.607)— Panama City HBL (9.595)—Geneva HBP (7.797) (League of Nations)
5:40 (Sat.)			
6:00 (ex. Sun.)	2RO4 (11.81)—Rome	EAR (9.488)—Madrid	
6:30			HP5A (11.7)— Panama City
6:30			
7:00	EA9AH (14.05)— Tetuan, Morocco	RAN (9.6)—Moscow	
7:15	CSW (9.94)—Lisbon	RKI (7.54)—Moscow	
7:30	EAJ43 (10.37)—		CSW (9.94)—Lisbon
7:40	Salamanca, Spain, via Tenerife, Ca- nary Islands		GSD (11.75) GSB (9.51) GSP (15.31) (British)
8:15	Radio Nacional (10.37)— Salamanca, Spain DJB (15.2)—Berlin DJD (11.77)—Berlin		
8:30 (Mon.-Thurs.)			OLR4A (11.84)— Prague (Little Entente) GSB (9.51) GSD (11.75) GSC (9.58) (British)
10:10			
10:30	DJB (15.2)—Berlin DJD (11.77)—Berlin		
10:45			CJRO (6.15)— Winnipeg CJRX (11.72)— Winnipeg
11:30		TPA4 (11.714)—Paris	TPA4 (11.714)—Paris
12:30 A.M.	JZK (15.16)—Tokio		

This chart shows hours (daily), stations and frequencies in megacycles when international transmission in English may be heard, atmospheric permitting.

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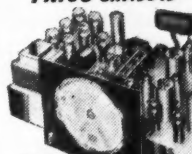
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Short Wave Flashes

(Continued from page 44)

1:30 a.m. over JZJ (11.8); for Eastern North America, 7 to 7:30 a.m. over JZJ; for the South Seas, 8 to 9:30 a.m. over JZJ; for Europe, 2:30 to 3:30 p.m. over JZJ (9.535); for South America, 4:30 to 5:30 p.m. over JZJ and JZI, and for Eastern United States, 6 to 6:30 p.m. over JZJ. . . *Philippine Islands*—KZRM (9.57), Manila, Mondays through Fridays 5 to 9 a.m., Saturdays 5 to 10 a.m., Sundays 4 to 10 a.m. and weekdays 4:30 to 6 p.m. . . *United States*—For W2XAF and W2XAD (including new frequencies): over W2XAD on 21.5 mc's, daily 8 a.m. to noon; on 15.33 mc's, daily 12:30 to 7 p.m., and on 9.55 mc's daily 7:30 to 11 p.m. Over W2XAF (9.53), daily 4 p.m. to midnight. . . *Australia*—For VLR (9.58), Melbourne, weekdays 9:30 p.m. to 8:30 a.m., Sundays 3 to 7:30 a.m. *Norway*—For LKJ1 (9.52), Jello, week-days 4:30 to 10:30 a.m. and on Sundays 2:30 to 10:30 a.m. . . *England*—Important changes in timing of "Empire Programs" from Daventry will be made early in April.

Frequency Changes

Costa Rica—TIWS, Puntarenas, now variable near 6.64 mc's. . . *Peru*—OAX5C, Ica, to 9.49 mc's. . . *Cuba*—COBC, Havana, to 10.03 mc's.

Data

Portugal—CSW3 (9.95), Lisbon, now operating daily 5 to 7 p.m., signs off with a clock striking midnight, followed by the National Anthem. . . *Siam*—HS8PJ, Bangkok, operating on 19.02 mc's, Mondays 8 to 10 a.m. and on 9.5, Thursdays 8 to 10 a.m. with a power of 5 kw., is again verifying. The interval signal is 3 chimes in an ascending scale. . . *Ecuador*—HCJB4 (7.41), a new low-power transmitter at Portoviejo, in the province of Manabi, irregularly transmits gospel programs for the benefit of listeners who are not reached by HCJB in Quito. . . *Curacao, N. W. I.*—PJCI (5.94) is now operating weekdays 6:30 to 8:30 p.m. Reports can be sent to Johan P. Curiel, Mondo Nobo No. 143, Curacao, N. W. I. . . *Columbia*—HJ4ABU (8.64), Medellin, Colombia, is transmitting experimental broadcasts daily 8 to 10 p.m. . . *Guatemala*—TGQA (6.44), Quezaltenango, officially inaugurated on February 2, broadcasts with a power of 200 watts, on Mondays through Fridays, 9 to 11 p.m., Saturdays 9 p.m. to 1 a.m., and on Sundays 1 to 3 p.m. . . TG2 (621), "Radio Morse," power 200 watts, relays TG1 of Guatemala City, Mondays through Fridays 6 to 11 p.m., Saturdays 6 p.m. to 1 a.m., Sundays 7 to 11 a.m. and 3 to 8 p.m. Reports should be sent to the Director General of Communications, Guatemala City. . . *St. Kitts, B. W. I.*—VP2LO (6.384), owned by the Caribbean Broadcasting Co. and operated by Robert and Jack Steward, is broadcasting test programs daily 4 to 4:45 p.m., Sundays 10 to 10:45 a.m. and on Wednesdays 7:30 to 8:30 p.m., with a power of 500 watts. Reports are solicited. . . *Burma*—XYO (6.007), a 1 kw. experimental government station at Rangoon, which trans-

mits for three hours daily, is being heard occasionally on the Pacific coast near 9 a.m. . . *France*—TPB2 (15.13), one of the frequencies of the new Essarts short-wave transmitter, is being used in parallel with TPA2 (15.243), Pontoise, almost daily from 7 to 9 a.m., and in parallel with TPA3 (11.885), from 2 to 3 p.m., and irregularly at other periods. Reports on the new station should be sent to "Radio Coloniale," 98 Boulevard Hausemann, Paris, France.

Reception on the Amateur Bands

The 20-meter amateur band has opened up, affording excellent reception from all parts of the world. For example, on February 21, between 1:25 and 3:40 a.m. (EST), John DeMyer of Lansing, Michigan, logged 41 different amateurs from Europe.

ES5D (14.07), owned by Karl Kallemaa, Jaama 8, Tapa, Estonia, is being heard excellently from 1 to 2 a.m.

Warren Reichardt of Reading, Mass., reports a ham giving his call as PI7G (14.08), location as 17 miles south of Lisbon, Portugal, and power as 17 watts. Judging from the prefix the station must be an outlaw.

Dorothy Hall, W2IXY of Springfield, N. Y., recently contacted ZC2OP (14.355), "O for Ocean—P for Pedro," transmitting from one of the usually uninhabited islands of the Cocos Group, 400 miles west of Costa Rica. The operator of the station, which is run from three storage batteries, is an American from near Chicago. He is one of a group of 8 men who are there hunting treasure, subsequent to finding a purse last year.

Last Minute Notes

Canada—CRCX (6.09), Bowmanville, went off the air February 28, and will remain off permanently. . . *Mexico*—XEYU, "Universidad Nacional de Mexico," located at Justo Sierra No. 16, Mexico D. F., mentioned under "New Stations—under construction," at beginning of this department, is now on the air, testing its 1500 watt transmitter. The regular schedule will be daily 3:30 to 4:30 p.m. and 8 p.m. to midnight (EST) on 9.6 mc's. . . *Uruguay*—The following new 2½ kw. short-wave stations are now under construction in Montevideo: For S. A. D. R. E. P., CXA20 (9.7) and CXA1 (11.945); for H. L. A. Landeira, CXA3 (6.075); for Figueira Canapa & Cia, CXA5 (9.485); CXA7 (11.735) and CXA16 (15.38); for S. O. D. R. E., CXA6 (9.55), CXA10 (11.895), CXA18 (15.3) and CXA21 (26.5); for Espectador, CXA9 (9.44) and CXA19 (11.695); for Francisco Gomez Cabels Cia, CXA11 (5.92) and CXA12 (11.945); for Jaime Yanelevitch, CXA13 (6.155) and CXA15 (9.735); Issac Raisenvitch, CXA14 (15.16), and for Figueira Canapa & Cia, CXA17 (17.8). Practically all of the firms mentioned as owners of the new stations operate broadcast stations in Buenos Aires. These new short-wave transmitters will relay their stations from Montevideo, Uruguay, as the Argentine government has refused to license further short-wave transmitters in that country.

Radio—Spanish War

(Continued from page 29)

principles and motives through contact with the Spanish people. Most of the people on both sides do not have the slightest idea of what they are fighting for. They are spurred on to fight by their leaders who are masters in the art of applied mass-psychology. These political leaders employ various means of convincing the people that their side is right, using one of the newest methods for the dissemination of war propaganda: *radio*.

Within a few days after the war broke out in July 1936 all major radio broadcasting stations in Spain and Morocco were seized by either the Rebels or the Loyalists, and almost immediately propaganda belched forth from these stations. This flow has not stopped yet. Although confined mainly to the broadcasting stations on the long waves, all short wave broadcasts have a burdening share of this propaganda. American listeners can pick up many of these short wave stations and get a distant idea as to the scope and use of radio in modern warfare.

Entertainment has been put into the background on almost all short wave programs, and does not exist on the regular programs emanating from stations on the long waves. From morning until night there is an unceasing flow of chatter from both the Rebel and Loyalist transmitters, each claiming the same military victories, each spurring the people onward to defeat the other side, and each with its ample share of talkative under-generals who make our own filibustering politicians sound like amateur public speakers. The Rebel operated station at Sevilla is probably the strongest station held by the Insurgents; the Loyalists still operate the key Madrid station and those in Valencia and the capitol: Barcelona.

There are four stations somewhere in western Russia, each having a power of at least 100 kilowatts, which employ directive antennas radiating Communistic propaganda on the long waves in the general direction of Spain. These stations are heard quite clearly throughout most of Spain; programs were in Spanish. There is some Rebel propaganda emanating from Italian and German stations also.

Thus from every direction the Spaniards are bombarded with a ceaseless flow of biased, long-winded orations by political gas bags. Many of the stations operate on a twenty and twenty-one hour schedule; and at any hour of the day or night one has little difficulty in picking up these programs, even with the cheapest receivers. News reports are so heavily censored that they resemble verbal sieves; they also represent the height of ambiguity. Only when the speakers run out of breath (and that is very seldom) is there any music or non-political radio entertainment. I once heard a Rebel general orate for three hours without a single stop. It can truthfully be said that the publicity and propaganda departments of both sides certainly "talk a good war."

The Insurgents were not slow to realize the possibilities offered by such high-

powered amplifiers, and many were constructed behind the lines and soon put into operation.

On some days when the fighting was dull it was not uncommon to hear the huge loud-speakers blasting forth recorded music. Although it added an ironic touch to the military scene, it probably had some entertainment value. American made records predominated, most of them having been shipped to the front by the broadcasting stations behind the lines.

Working as a radio operator for either the Loyalist or the Rebel army is accomplished under such dangerous and exacting conditions that there are comparatively few radio engineers employed by either side. Such work is, of course, confined to only the necessary army inter-communication, between the front and "key" towns and cities, and between adjacent battalions on the front lines. Most of the radio men in the employ of the Rebel government are either German or Italian; there are probably not more than forty such positions. All types of radio equipments are in use for this communication purpose, including many composite and ancient transmitters. There is a great deficiency of replacement parts and necessary tubes.

There are a number of mobile field stations which advance with the regular army. I was in charge of such a unit. These portable units usually consist of a low-power radiotelegraph transmitter and a long-range receiver, both mounted in a closed six-wheel army truck having tractor treads for travel over rough terrain. Living quarters for the engineer and two assistants (sometimes three) are also in the interior of the truck. These camouflaged units advance or retreat with the front lines, advising the district army headquarters (located at focal points) as to the progress of the division. A secret cipher is used employing morse as a means of transmission; a different frequency is used every three hours which required a great deal of careful retuning.

Probably my greatest thrill during the war was when my unit was attacked by two small French pursuit planes. Fortunately little damage was done, due to a thin steel plate covering which enclosed the truck body. However that same unit survived only to meet with a worse fate at the hands of a huge German Heinkel which dropped a high-explosive bomb squarely on the truck. The unmarked mobile unit had been mistaken for a Loyalist surveying truck, but fortunately I was not in the truck when it was struck.

There were many other episodes, too numerous to mention. I worked under great difficulties and under considerable strain. Following the demolishing of my mobile field unit I was successively in charge of three radiotelephony transmitters, and a low-powered broadcast station. I saw a great deal of actual fighting, but even though I carried a gun at all times I was never called into actual fighting service in the trenches.

Ship radio operating is confined to only a few Spanish ships, of both sides, in the Mediterranean. Since there is quite a bit of open water warfare, and consequently much resulting traffic, listeners along the

Mediterranean with sets covering the long-wave marine channels are offered a ring-side seat at each naval combat.

With the advent of the war, amateur radio met an untimely and unfortunate death. By official decree both sides confiscated all radio transmitting or communication devices within a few days after the start of the war. In almost every instance the "hams" co-operated with the controlling government. Many of the "hams" became operators in the employ of the government. There can be little doubt but what the "hams" gave a great deal of assistance wherever they could. Many of the larger amateur stations were completely taken over, and then operated as a military station.

Although radio is one of the greatest educational mediums—thereby promoting peace—ironically, by the same token, it has also become as deadly and dangerous as any type of munition or article of war, causing destruction of the same civilization that created it.

Thank you for asking about me.

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—30—



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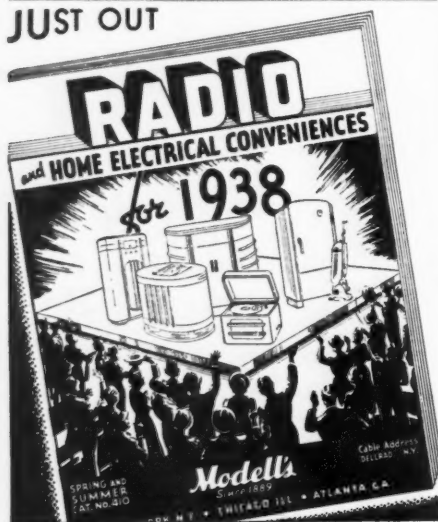
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Mr. and Mrs. of Radio

(Continued from page 17)

—husbands and wives seldom enjoy the opportunity of appearing together. Conditions in those arenas of professional activity do not encourage such association. But in radio the Darbys and Joans are welcomed on the theory their presence helps to maintain the family atmosphere the microphone moguls strive so zealously to attain.

Nevertheless, there are people (no doubt of highly suspicious natures) who profess to be disturbed at the spectacle of so many married women working with their husbands on the air. Since it is generally understood that radio comedians receive fabulous salaries, they think there must be something wrong in a moral makeup which permits such arrangements. Otherwise (the skeptics contend) the wives would be home where they belong (still, according to the critics) doing their darning, rearing the children or attending to some other family duty.

The suspicion that radio comedians, being money-mad or worse, enslave their wives, making of them mere "jokemates" as it were, is unwarranted and unjust. The truth is the wives are on the air because they want to be there and all the king's horses and all the king's men couldn't dislodge them. Working alongside their husbands they have won not only fame for themselves but found great peace and happiness. To them, radio has been established as a veritable Ether Eden.

Consider, for example, the cases of Mary Livingstone, who loves to heckle Jack Benny and write verse, and Jane Ace, the central figure in the Easy Aces episodes. Both found radio an escape from a life of humdrum as housewives. Each was launched on a professional career by accident under identical circumstances.

Miss Livingstone, before she married, was a hosiery and lingerie buyer for a Los Angeles department store. At the time of their marriage Jack was a monologist in vaudeville and that meant long tours on the road. Some times Mary accompanied him on his travels but more often she occupied a hotel room alone in some metropolitan center while her husband was away playing the smaller surrounding towns. A home-loving girl, this sort of life didn't appeal to Mary and she was frequently mighty lonesome.

Just when she thought it impossible to endure her loneliness any longer, destiny took a hand in the situation. Jack was engaged to do his monologue on the air program with Band Leader George Olsen and Vocalist Ethel Shutta, another of radio's successful husband-and-wife combinations. They made it possible for Jack and Mary to be together for a while at least.

Then one night Benny found himself shy of material with which to complete his part of the program. He beckoned Mary to the microphone and engaged in banter with her, filling out the allotted time. It was Mary's first experience as Jack's "stooge" and while she was thrilled she was appre-

hensive as to the reaction of listeners. But without cause as was subsequently revealed.

The next broadcast and the following Jack worked alone as customary. And provoked from loudspeaker addicts so many letters demanding to know what had become of the girl who had appeared with him that Mary was restored to the act. Thus created as a radio personality, more or less in response to public clamor, Miss Livingstone has been Benny's foil and heckler ever since—and she no longer gets lonesome.

Jane Ace's introduction to the mike was just as casual and noteworthy. Back in 1929 Goodman Ace was occupied as columnist and theatrical critic on a Kansas City, Mo., newspaper. On the side he did motion picture comment for a local radio station. One broadcast, like Benny, he didn't have enough copy prepared to round out his time and, just as Benny did, he called upon his wife who chanced to be in the studio to help him out.

They *ad libbed* for the necessary period and the next day, to the amazement of both, an advertiser who had heard their broadcast called up to make a proposition: if Ace would build a comedy program around Jane he would buy time on the station and sponsor them. Easy Aces, now in its eighth year on the air, was the result.

Mrs. Ace, up to that moment when she responded to her husband's SOS, had never spoken a word in public. She knew nothing about acting and boasts she still knows nothing about histrionics. Hubby agrees with her and insists the same goes for him, too. They figure whatever success they have achieved is due to the naturalness of their scripts and themselves—especially to Jane and her mannerisms. Off the air her voice—that soft, semi-Southern drawl so perfect for a dumb-cracking comedienne—sounds the same as through your loud-speaker. She originates many of the remarks which Ace slightly paraphrases and writes into the scripts as malapropisms.

Gracie Allen, of course, comes under another classification—if "the nitwit of the networks" can be classified. Anyway, she was a professional before radio, although it was radio which elevated her to the heights of popularity and Hollywood. Burns and Allen had their origin in vaudeville and in the beginning the husband was the comedy end of the team. But audiences failed to react to his funny answers to Gracie's supposedly innocuous inquiries and they reversed their roles with happy results. Now Burns has to content himself as the wisecracker off the stage, screen and radio, cutting comedy capers for the benefit of anybody who happens to be around. Gracie, on the other hand, makes no attempt to be funny when she isn't being paid for it and keeps in the background, dutifully appreciative of her spouse's mirth-making.

Likewise Marian Jordan, the Molly of Fibber McGee and Molly, Irene Noblette, of Tim and Irene, Nora Cunneen, Uncle

Ezra's Cecilia, and Norma Talmadge, who appears occasionally on the program presided over by Hubby George Jessel, were established as entertainers before radio. Miss Talmadge was a star in the days of the silent movies. Miss Jordan, Miss Noblette and Miss Cunneen were partners with their husbands in variety and are among the few two-a-day performers who have found sanctuary in the broadcasting studios since the collapse of that once popular form of amusement.

Portland Hoffa also had stage experience before going on the air with her husband, Fred Allen, the tongue-in-cheek satirist responsible for the "Town Hall Tonight" proceedings. She was a member of George White's Scandals and later appeared in the first Little Show and Three's a Crowd. She was also with Mr. Allen in vaudeville.

Mrs. Allen inherits a sense of humor from her father, Dr. Frederick Hoffa, a traveling eye specialist. Her odd Christian name, Portland, is evidence of her dad's playful fancies. He so christened her because she was born in Portland, Oregon; an older sister is named Lebanon, after Lebanon, Pa., where she first saw the light of day; and it was her father's intention to label all his children after the cities of their birth.

But when a third daughter came to bless his home he reneged. Trying to be prophetic he called her LastonE, the capital E being no typographical error but another whimsy of Poppa Hoffa. Just the same the stork halted again at the Hoffa homestead with a fourth daughter. The doctor wanted to name her "Period" but to this Mama Hoffa violently protested. So he bestowed his own name on the last arrival, feminizing it to become Doctor Fredericka Hoffa.

Of all the husbands and wives in radio the Fred Allens are the least socially inclined. The Bennys and the Burnses, on the contrary, are great pals and constantly foregather. Fred is more or less of a recluse and he and Portland keep pretty much to themselves. They haven't a car nor even a servant and when in New York hide themselves away in a modestly furnished apartment in the West Fifties.

One reason the nasal comedian seeks seclusion is because he writes his own material and this takes up a surprisingly large amount of his time. Most radio comedians hire gagmen in gangs (it is nothing for three and four writers to collaborate on a single script) and they apparently have more leisure for social contacts. Fred's workroom is in the apartment and when he retires to his study Portland stands guard to see that nobody and nothing disturbs him.

"Fred isn't a bit temperamental," explains Mrs. Allen, "but he can't work where there is noise and confusion. It is my job to see that there are no interruptions of any kind when he is in the throes of authorship. Unlike most busy husbands he doesn't require any particular waiting on. Fred was a bachelor so long before I met him that he became a self-sufficient person. He never strews his clothes about or leaves his papers in an untidy mess. He is really a housekeeper's joy."

Since radio makes it possible for actors to live family lives just like other mortals,

it is natural its denizens should go in for homes and babies. The Fred Allens may be content to live in a rented apartment but not so the George Burnses, the Jack Bennys, the Eddie Cantors and the Al Jolsons. Those who are celluloid as well as kilocycle celebrities, and therefore permanent residents of Hollywood, have elaborate homes in the California hills with swimming pools and all the trimmings.

The children have been provided both by grace of God and grant of the courts. The shining example of the first agency is, of course, Eddie Cantor, with five daughters of his own. The Bennys, the Burnses and the Jolsons acquired theirs by the adoption route. Denied progeny, the foster parents have made up for the omission by bestowing upon erstwhile foundlings the same care and affection they would accord their own offspring. In each instance they are providing not only every advantage that money can supply for the development of their adopted children but they have also insured their well-being in the future, no matter what contingency may arise, by arranging endowments and trust funds.

And if you think they aren't proud parents just ask Jack Benny how Joan Naomi is getting along or inquire of Gracie Allen what mischief Sandra or Ronnie have been in lately. (The Burnses have adopted two children, Sandra, aged three, and Ronnie, aged two.) Take it from this correspondent such inquiry will bring you an earful of childlore so detailed as to leave you dizzy. Snapshots will be miraculously produced to prove that Joan or Sandra or Ronnie (depending, of course, on which foster parent holds you prey) is the most wonderful infant in the world. Benny, usually the most genial of men, can be mighty brusque if anybody tries to stop him when it's time for him to go home and romp with the baby. And Miss Allen has been known to cancel a week of social engagements just because Sandra had the sniffles. More devoted parents aren't to be found anywhere.

Prominent as the comedians and their wives may be in the public ear because of the wider appeal of comedy programs, they were not the original couples to go on the air nor have they any corner on connubial bliss. They were antedated by such personages as Frank Crumit and Julia Sanderson, musical comedy stars who wearied of a life of trunks and sleeper jumps and began their radio careers together way back in 1928. Another pair of pioneers, Peter de Rose, the pianist-composer, and May Singhi Breen, his ukulele-playing mate, have been performing even longer as "The Sweethearts of the Air." Skyland Scotty and Lulu Belle, of the National Barn Dance, are another couple familiar to country-wide audiences after years of broadcasting and domesticity.

And the air is all cluttered up with maestros and maids who are Mister and Missus when sign-off time comes in the studios. Conspicuous among them are Ozzie Nelson and Harriet Hilliard, Enoch Light and Mary Danis, George Olsen and Ethel Shutta [pronounced "Shuttáy."—Ed.] and Xavier Cugat and Carmen. Gladys Swarthout and Hubby Frank Chapman team up for the air and another singing duo is Don Ross and Jane Froman, whose romance began in a radio station.

In addition there are numerous married folks among the players in serials and dramatic sketches. Since most of these perform behind the cloak of anonymity—radio casts are not publicized like stage and screen presentations—their names are unknown to the general public and omitted here.

Married professionals advancing their art on the same programs have not only the comforts of companionship and share in the glories of achievement but they also share salary checks. And these factors seem to make for harmony in the home for it is doubtful if in any walk of life there is to be found any happier couples than the broadcasters and their belles.

Anyway, it is significant that divorce and scandal are practically unknown in radio—in such happiness, comfort and content do the lords and their ladies abide in the air castles. Which should be of some concern to those who contend that life in the entertainment world is incompatible with domestic felicity. This thesis has been advanced so long it has become a theatrical tradition; still it doesn't apply to radio folk, the facts being what they are.

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NAME
ADDRESS
CITY STATE

Studio Briefs (Continued from page 10)

WGN—Mutual Briefs

Pierre Andre is the new announcer for the "Kay Kayser's Musical Klass" program which is aired each Tuesday evening at 7 p.m. (CST).

Fran Caughlin of continuity department is a candid camera hound. His apartment is the meeting place of many camera addicts where pictures are displayed each evening and criticized by a jury.

Lou Jacobson, new production director, is well known as a musician as well as producer. He was organist and also librarian for the famous Erno Rapee for several years.

Clyde White, supervisor in master control room, just received a renewal of his flying license. Clyde is conducting a class for aspiring aviators out at Sky Harbor airport, Chicago.

The engineering staff is planning a new mobile unit for short wave work on pickups.

Kay Campbell, dramatic actress, is vacationing in California where she may take a fling at the movies.

Edna O'Dell, popular songstress, won't sing classical music in any form. "Pop tunes are my style," she says, "so why try the operas and arias?"

Leonard Salvo, organist, is starting work in his garden. Two years ago Len moved out to Chicago's suburbs where he has an extensive garden with many varieties of flowers, bushes and trees. A green-house is Len's ambition.

Orson Welles, stage and radio star and the man who began the trend toward Shakespeare in the "Modern Manner" commuted between New York and Chicago by airplane for his broadcasts. The show was known as "Orson Welles Forum on Shakespeare in the Modern Manner," and it was presented before audiences composed of dramatic students and teachers, in the Erlanger Theatre in Chicago.

Jess Kirkpatrick, announcer and master of ceremonies, started to play handball to reduce his waistline and has become an expert at the pastime, defeating some of Chicago's best in matches. He's also WGN's champion without much opposition.

CBS—Chicago Briefs

Louise Fitch, the comely young CBS-Chicago actress who does the commercial announcements on "Poetic Melodies" and plays femme parts on several dramatic shows, was a leading lady in a quickie marriage to Jerry Rosenthal, Chicago attorney, on Friday, March 4. . . . George Livingstone left CBS press department in mid-March, to take a fling at free lance publicity business. . . .

Bob Kania, controlman, married late in February to Mary Alice O'Shaughnessy, secretary in the sales department. . . . Sports caster Pat Flanagan and his wife on an extended tour through the west on vacation, which will include boat trip through the Panama Canal. . . . Pianist Howard Neumiller vacationing in the north and east (and in this kind of weather!). . . . Wayne Van Dyne is the name of that pleasant tenor singer who is now heard on Tuesday and Friday afternoons from here. Wayne, recently signed to the staff, is an ardent camera hound, specializing in micro-photography. . . .

Announcer Bill Fifield is proof that you don't need a "drag" to get into radio. Fresh from a university near Seattle, Bill visited Chicago, got an audition at the local outlet, and was immediately hired. . . . Virginia Payne ("Ma" Perkins to you) continually surprises people who meet her in real life, because she is such a tiny woman. Her voice sounds almost amazonic. . . . Margarette Shanna "Arnold Grimm's Daughter" leading lady, is rapidly gaining an attendance record for appearances at the Chicago showing of "Richard the Second," starring Maurice Evans. To date she has seen the performance four times over—each time with friends of her or her brother, Sidney Smith, who takes an important role.

Bill Bouchey of "The Romance of Helen Trent" is often asked by members of the cast to take a look at out-of-order watches before they scurry around to the jewelers just so he can tell them if it's anything serious or not. He once was a jeweler himself and specialized in clock repairing. . . . Francis X. Bushman has been asked to speak before a prominent Chicago women's club on his adventures as a world traveler. . . . Virginia Clark has vacationed in the Southland since March 18 and was written out of the script for three weeks. She and her husband, Chicago business man not connected with radio, motored, hitting New Orleans and Miami.

A language school has just enrolled Spencer Bentley and is teaching the actor how the natives speak Spanish in Mexico—pardon, "Meh-hee-ko." . . . Home to his home town of Philipsburg, Pennsylvania, is a trip in the offing for "Poetic Melodies" tenor Jack Fulton. Oddly enough he is the only member of a large family, all boys, who is in radio—the rest are all in the insurance business including his father, who is the district supervisor of a large company. . . .

Alice Hill, who has just bought a 28' sail boat, has also purchased a little boat to go with it, more technically known as a dinghy. The big boat's name is "Foo" and the little one—"Foo Young."

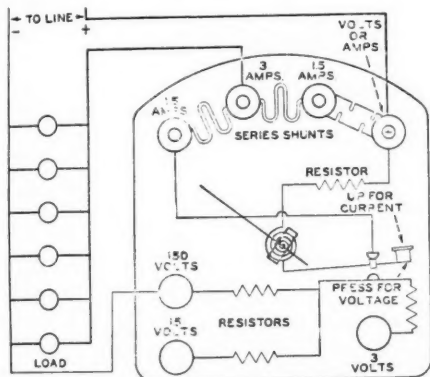
RADIO PHYSICS COURSE

ALFRED A. GHIRARDI

Combined voltmeters and ammeters:

For certain applications, instruments of the movable-coil type are arranged so that the same instrument may be used either as a voltmeter or as an ammeter, and successive readings of voltage and current may be made with great rapidity. Such instruments are called voltammeters.

In order to obtain a clear idea of the general layout of one of these instruments, a connection diagram is shown below. The shunts are in series with each other, and are connected in multiple with the movable coil through a resistor and a pushbutton. When connected in the line, only a small part of the current flows through the movable coil, but the pointer indicates the total current, because the current flowing through the movable coil is always an exact fraction of the total current, and therefore, the scale is calibrated to indicate this total current which is being measured.



If the proper voltage range is connected across the line and the button is pressed, the main current continues to flow through the shunts, but the pointer no longer indicates amperes because the movable coil circuit to the shunts is opened; and when the button is fully depressed the movable coil will form part of the voltage circuit.

Since a correctly adjusted non-inductive resistor is connected with each voltage range, the one in use will indicate volts, because the current which will flow depends upon the voltage of the circuit. This instrument may, therefore, be used to give volt and ampere indications in practically instantaneous succession as the button is pressed and released.

Instead of having a single hundred and fifty volt resistor tapped at the proper resistances for each of the lower ranges, as previously explained, there are three separate resistors each capable of taking care of the voltage designated on their respective terminals. With this arrangement, if one of the resistors should become damaged, it will not affect the operation of the instrument on the other ranges.

When a separate shunt or series multiplier resistor is used to extend the range of a meter it is important to use accurate seasoned resistors designed for the purpose. The maximum per cent error in any case, is the sum of the per cent error of the moving element and the per cent error in the resistance used. A moving element that is accurate to say 2 per cent would never be more accurate than this no matter how ac-

curate the multiplier is made. On the other hand, if the meter is of an expensive type having a moving element with a high degree of accuracy, a very accurate multiplier should be used. If closer accuracies than one per cent are required, it should be specified that the resistors which are provided, should be accurate to better than 1/2 per cent.

Fortunately, special wire-wound resistors of an accuracy of one per cent and less are now available commercially, as contrasted with the wider tolerances of ten per cent and more of ordinary commercial resistors. Furthermore, these resistors are thoroughly seasoned. That is, they have been aged so that no resistance changes over a period of time due to easing up of the molecular strains caused in the wire by the tension applied during winding will occur.

These perfected wire-wound resistors now make it possible to convert meters into multi-range instruments with every assurance of accurate reading, on all the ranges.

Wattmeters: In a direct current circuit, the electrical power in watts expended in the circuit, is equal to the voltage multiplied by the current in amperes. These factors can be determined simply by connecting an ammeter in series with, and a voltmeter across, a d.c. circuit and taking the readings. Thus, suppose the ammeter reads 5 amperes and the voltmeter reads 110 volts; the power in watts will equal $W = E \times I = 110 \times 5 = 550$ watts.

In an alternating current circuit, the power is given by $E \times I$ only if the apparatus connected in the circuit is purely resistive in character. If the apparatus is inductive or capacitive (excepting in the case of resonance) the power factor ($\cos \theta$) must be considered, and the true power in watts will be equal to $E \times I \times \cos \theta$, where $E \times I$ gives the apparent power.

The power in either an alternating current circuit or a direct current circuit can be measured directly by a wattmeter. This automatically multiplies the volts and amperes together and indicates directly the instantaneous value of the true power in either kind of circuit, regardless of the power factor. The wattmeter is really a combination of two instruments in one, a voltmeter and an ammeter.

Care must be taken to see that a wattmeter is not connected in a circuit carrying either a current or a voltage value above the maximum current and voltage rating of the wattmeter, for overheating or possible burnout of the coils will result. For example, on a particular 1500-watt instrument the maximum current rating is say 10 amperes and the maximum voltage rating is 150 volts. If this instrument were connected in a circuit in which 20 amperes were flowing and an e.m.f. of 50 volts existed, the current-coil of the meter would be overloaded even though the meter would be indicating only $50 \times 20 = 1,000$ watts.

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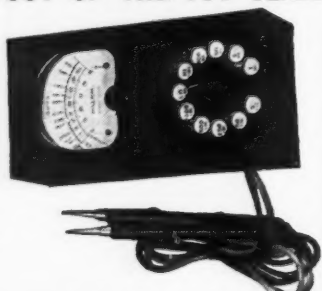
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Radio Rackets

(Continued from page 11)

environment thrills them. They are easily led to believe that they are training under the same set of conditions as those in a real broadcasting studio. They abhor any suggestion to the contrary.

The situation herein discussed is one which was discovered in a large city. The "Schools" are those of a "gyp" character, and the experiences with such "Schools" are not to be confused with legitimate places of instruction for radio, drama, music and the forensic associations. In the average community these are well known and may be identified by inquiring at any local radio broadcasting station or at the board of education.

One student, Mary Stuart, who was smarter than the rest because she had the opportunity to talk to real radio artists and executives, told us her experiences with one of the most advertised "schools" of drama and radio.

She thought it was superior to the ordinary schools because it demanded a tuition fee of \$175 a semester. It was conducted just like a college with hourly class periods covering a comprehensive gamut of instruction. Such subjects as announcing, microphone technique, acting, and script-writing were taught by people professedly connected with radio. Pedagogic hocus-pocus made complicated classifications of the simple art of broadcasting. The students were delightedly bewildered.

Mary was given encouragement by the head of the "college." He promised to make her the lead in a radio play he hoped to sell. Weeks passed but the play did not materialize. The president told her that she was a wonderful little actress and someday one of his many connections in the radio world might help her. Mary became suspicious. She began to ask men at the major networks if they knew the honorable president of the radio college. No, they had never heard of him. Even the teachers, who were supposed to be actively engaged in radio turned out to be active only in a very minor way. For the most part they were superannuated stock actors occasionally employed to fill in. Had they been successful in radio, they would not have had any time for teaching. Wisely, Mary left the school and began to make the rounds of advertising agencies and radio stations, where she soon found out experience at a school or radio was generally laughed at.

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Another school is run by a disappointed "hooper." He found dance-teaching so unprofitable that a few years ago he added radio classes to his bill of fare. The tyro waits in a reception room and is intrigued by the high vaulted ceiling, marble statues, and archways. Appreciation of this art and beauty is added as an overhead cost to his audition fee. Here he has to shell out \$3 for the privilege of being heard by the dance master and his satellites. But it is worth it, he is told. Because, if he is deemed worthy of being admitted to the classes, he will be instructed by people who know radio. Rarely is he not admitted regardless of his ability; the failures occurring in direct proportion to the inability to pay for future lessons.

"We are a licensed booking agency," says the fat lady behind the desk in the inner office, "and we have placed some of our students in auditions at QZZ and on the 'Twaddle Dee Soap Flakes' program." Furtively she watches her prey to see if he reacts with the customary signs of amazement. If he does, she knows he is good for an indeterminate number of class and private lessons.

A check-up with QZZ proved that the network does give auditions to the students of all schools, and naturally those of the dance master are not excluded. For that matter any unattached individual can get an audition at the times set apart for this purpose. A check-up with the production company that puts on the Twaddle Dee Soap Flakes Hour revealed that the dance master was an unknown quantity and if any of his students obtained roles in the show they were won on their own dramatic ability.

When your reporter visited another coach, he had a fighting hard time to keep a straight face. He was overwhelmed with scrapbooks with countless pasted newspaper clippings preserving every last publicity notice ever printed about the school and the students. The notices actually said nothing. This organization was energetic on its own publicity, but it placed a terrific strain on the credulity of the initiate when it engaged in such practices as issuing a highly embossed "certificate" to each student, which "registered" the number of "broadcast-hours" to his credit. The student was supposed to tote this badge of merit around with him when looking for a job. By some insidious process of magic, talent scouts would understand from this certificate that the student has had actual radio experience. Naturally, they will pass over with a contemptuous "poof-poof" the inconsequential fact that the broadcast-hours were not earned as a professional artist at all but as a "student."

The most flagrant exploitation of the desire to get on the radio is worked by a company in a large city which has set up theatre groups ostensibly to give amateur actors experience in radio plays. On the surface the scheme is very innocent. Members pay only a nominal fee, \$3 per month, and are entitled to attend four rehearsals. They meet in groups of six or seven and take part in the radio masterpieces written by a girl of nineteen, who is co-owner of the company. The performances are abominable. But that is a matter of no importance. The participants enjoy themselves

and feel an ethereal sensation that they are living close to the divine world of radio.

Fifty or seventy-five such members provided the wherewithal to pay for the rent, the electric bills, and ice cream sodas for the wily organizers. There never has been an actual performance given. But without a capital backing the theatre group is a very handy source of revenue with which to maintain an office. The real purpose of the company is to sell radio transcriptions. An ad run in a national publication claims 750 different radio continuities available at regular rates together with a large assortment of tested radio continuities available for from one to 52 weeks in both script and transcription forms. They do not have one transcribed show, let alone 750. If they received an order for 6 records, they would not have the facilities, the capital nor the credit to make them. And yet they promise prospective theatre members to cast them in shows. Only on rare occasions do they live up to their other promise: to cast members in the sustaining shows they produce for a little station in a nearby state. They find that their novices just don't have the talent—except for paid rehearsals.

The unfortunate aspect of radio schools is that they nurture an unfounded hope in the heart of the ambitious beginner. He sees visions of springing blithely from cloud to cloud in a blue heaven of make-believe. He's practically a star already. And it's a 100 to 1 that he doesn't stand a chance to get a two-line part in a penny-dreadful melodrama.

The "schools" work the same ruin upon their students as some "amateur hours" work upon the neophytes. \$50 a week on a vaudeville tour looks like the Life of Riley to a winning amateur. When he wakes up without a job, because he has exhausted his limited number of routines, he is too spoiled to return to his \$18 a week job in the home town dry goods store. Frustrated in his "great ambition," he is useless as a worker.

One of the reputable theatrical representatives in a certain city, is always scouting for new picture or radio material. He might like a girl's picture in the newspaper or an actor in a little theatre group such as those now legitimately flourishing throughout the country during the summer months. Understand now, they're "found"—discovered by a man whose business it is to get potential box-office talent into the inner sanctums of radio and Hollywood. He calls them up. Here's where he meets a difficulty created by "schools of radio."

"They've heard so much about come-on rackets," said he "that they're dubious about the real thing when it comes along. I have to insist that they check up on this office before they come down to hear what I have to say."

"A real coach," he went on, "charges ten or fifteen dollars an hour. He has to. He's spent twenty years of his life soaking up all there is to know about the theatre. By that time he's learned the difference between entertainment and box-office value. When I have a radio actress who needs polishing, I get her odd jobs, where she has to do maybe only three lines in a dramatic commercial. But she has to

stay and watch the professional artists for hours at a time, from their first rehearsal until the show ends. That's the way to learn radio technique. I don't waste time on poor material.

"My main argument with the schools is that they use us booking agents for their own purposes. One of the 'schools' begged me to look in on a play it was giving. I was going to see some outstanding talent. Against my better judgment, I went and didn't see anything. But I heard something mighty annoying. From the conversation in the halls, I learned that the 'school' had been building that performance up for two months, exciting the students with the tale that a well-known talent scout was going to be in the audience and someone would surely go to Hollywood or on big time."

No school can make a radio artist out of you if you don't have a fortuitous combination of drama and vocal muscles to begin with. If you have this, why not go to a recognized school such as would be recommended by a reputable radio station or college information bureau. Your real radio teachers are the radio stations themselves and not the self-styled disciples of the great art of broadcasting. There is no short cut to knowledge—even in radio or drama. If you insist on one, we won't argue with you. We'll just say, "Go ahead. Enter the Sucker Lottery."

[Owing to the difficulty of obtaining the appearances of witnesses in law courts to enable legal proof of the above, and although actual students were interviewed and these conditions were verified, fictitious names and places are used throughout there being no intention to mention any particular person, school or association. Any similarity between persons or schools mentioned and actual ones is wholly coincidental.—Ed.]

—30—

Magic with Radio

(Continued from page 40)

you will have the means to a series of stunts.

Have your assistant out of the room and have a word selected in a book. When she is brought into the room you signal her thus. If the word was the second in the third line on page 12 you would signal two clicks and pause, then three clicks and pause, then one and two in fast order.

The assistant or medium receives the signals and takes the book in hand. She then turns the pages very slowly until she has reached the selected page. She will then ask if it is the right page and the person who selected the word will answer yes. She then asks them to think of the word. After a little hyplay she points to and names the selected word.

These are but a few effects that can be done with the use of radio. More will present themselves as you get into the swing of the thing. Remember that the showmanship and patter with which a trick is put over is more than seventy per cent of the game. Develop a pleasing manner of delivery, and the effect will more than please you and your audience.

—30—

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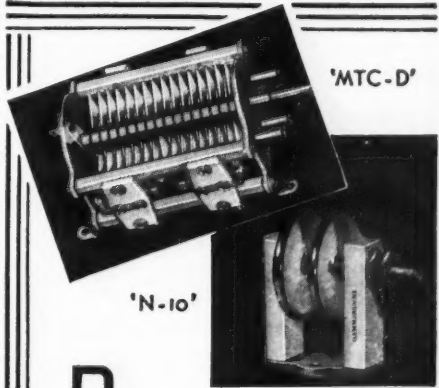
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Photocells

(Continued from page 51)

fore, generally unsuitable for sound reproduction. Their response is not linear with respect to light, and their sensitivity varies over rather wide ranges, so they are also unsuited for precise measuring work. They are less expensive than most other photocells, however, and simple to use, and are therefore quite good for rough comparisons of light intensities, and for simple alarm circuits.

(2) The two types of photoelectric cells—i. e., the photocells which operate on the liberation of electrons from a sensitized surface—are the kind with which we are all most familiar. The vacuum type of photoelectric cell generally uses one of the rarer metals for its active element—caesium, potassium, sodium, rubidium, lithium, etc., or their compounds—and it affords modern science the most delicate measuring instrument it has. The response of a vacuum cell is zero in darkness, except for possible minute leakage, and its output varies *directly* and in *linear relation* to light intensity over a very wide range, and is practically instantaneous. This makes this type of cell very good for precise measurements, and this is its chief use.

Vacuum-type photocells are generally built to operate in series with from 90 to 200 volts, but even with these voltages and strong light, the current through them is only a few *micro-amperes*, generally reaching a maximum of three or four. This is sufficient to operate a sensitive galvanometer directly, but it must be brought up through two or three stages of amplification before it can be used to control external circuits. These cells range from five to a hundred dollars in price, and are generally only used on the most precise sort of measuring equipment.

(3) The gas-filled type of photoelectric cell is the type perhaps which finds the widest variety of uses. Certainly, because of its use for sound-movie reproduction, it is the most generally used type of photocell. Its construction is identical with the vacuum-type except that small quantities of some inert gas such as argon or neon are introduced into the bulb. This gas has the effect of greatly magnifying the effect of the light, so that, operating under the same conditions as the vacuum type, it will pass in general about ten times as much current. The most usual type made in this country is enclosed in a UX-199 type of bulb, with a standard 4-prong UX socket, and made for operation in series with either 90 or 135 volts. Under strong light they will pass current of 20 to 40 micro-

amperes, and respond to as many as 40,000 changes per second.

These photocells may be used for measuring purposes nearly as well as the vacuum type, but over somewhat smaller ranges, and one stage of amplification brings their output up to usable levels for most control purposes. The most common type is the caesium cell, argon-filled, which is used for sound reproduction almost entirely, as well as for many commercial and experimental uses. They are made by manufacturers to sell from \$5.00 to \$20.00.

(4) The copper-oxide type of photocell is the first representation of the battery-type photocells. These have been written about extensively, and built by many experimenters, because the materials of their construction cost only a few cents, and they may be assembled in almost any glass jar of suitable size. They comprise an oxide-coated copper cathode, an electrolyte, and an anode of some dissimilar metal such as lead.

The current output of a well constructed copper-oxide cell is relatively quite large—of the order of several milliamperes—but its voltage, and therefore its power output, is quite low. They are suitable for use with a meter-movement type of relay, which they will operate directly, and the combination forms the elements of a simple alarm circuit. These cells deteriorate quite rapidly, and outside of experimental work have practically no use. They are never considered for even the most simple permanent or commercial uses.

(5) The other representative of the battery-type photocell is the dry-disk type, only recently introduced commercially in this country, although their construction was first developed and demonstrated nearly fifty years ago. These cells are, as their name indicates, free of liquid, and consist simply of a flat disk of metal, covered with a layer of selenium and finally by another layer of metal, this last layer being so thin as to be substantially transparent to light.

When light falls upon the surface of one of these dry-disk cells, it penetrates through the thin upper layer of metal to the selenium, thereby reducing its resistance, and perhaps also setting up some sort of a resonant-rectification effect. The result is, with moderately strong illumination, a current of several milliamperes, but, as in the case of the copper-oxide cell, only at a very low voltage, and therefore with only feeble power output.

As opposed to the copper-oxide type of battery cell, however, these disk cells do not suffer any appreciable deterioration with exposure to light, and appear

to last indefinitely. Their output is practically constant with given intensities of light, and their color-sensitivity approximates that of the human eye. Because of all of these things, these cells are finding quite wide use commercially, both for simple alarm circuits as well as more complicated and precise circuits for color matching and for automatic control of industrial processes.

[Further articles on this interesting subject by the author will appear in the coming issues of RADIO NEWS.—Ed.]

—30—

Answers to Radio Quiz

(Questions on page 18)

1. Phil Kramer.
2. Jack and Loretta Clements.
3. Claude. Incidentally, the boys are identical twins. Many listeners think that one person takes both parts.
4. Henry Burbig.
5. Arturo Toscanini.
6. Rosaline Greene. A veteran actress heard on many programs.
7. Pick Malone and Pat Padgett.
8. Guy Lombardo's. The orchestra has used the same style since coming from Canada in 1923.
9. Ed East and Ralph Dumke.
10. Madeline Gray.
11. Hugh Studebaker (Dr. Robert Graham); Marjorie Hannan (Ruth Ann); Patricia Dunlap (Janet Dexter); Marie Nelson (Ellen Collins); Olan Soule (Sam Ryder); Ruth Bailey (Marjorie Carroll); Dorothy Denvir (Margaret Gardener); David Gothard (Don Carpenter); Marian Redd (Elizabeth Hopkins).
12. Eddie Cantor. "Ida" is the name of his wife.
13. "Aunt Em" Lanning. She has a program of poems and philosophy on WLS. Made her radio debut at the age of 72 on a California station. Later had her own program over WROK, Rockford.
14. Phil Baker.
15. Ray Hedge.
16. Jim McWilliams.
17. Edward Johnson.
18. Four novelty singers who answer to the names of Joe, Ted and Judd McMichael and Helen Carroll.
19. Alan Prescott.
20. Irene Wicker.

Serviceman's Diary

(Continued from page 50)

to see that service job killed.

"We've got one more call this morning," I told him. "Perhaps we'll have better luck from now on."

"You can drop me at the store," he replied. "I think you are grasping the general idea and I'll be glad to watch how you progress."

I thanked him and went on about my work.

Bosses are funny!

—30—

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Flood Life Savers

(Continued from page 7)

they were not found wanting. Their periodic tests enabled them to work without any lost motion. With the aid of another unit of the Sheriff's department, known as the Sheriff's Aero Volunteer Squadron, they were able to direct traffic out of and into their districts and were incidental in evacuating more than 10,000 persons. The airplanes flying from above and using the ordinary transceiver units, contacted the mobile units, advising them of the passable roads and other necessary data as to where men and trucks could break through. These mobile units in turn worked with the main transmitter at headquarters and they contacted the proper divisions requesting such information.

The headquarters transmitter operated continuously for over 96 hours, carrying a tremendous load. Built by the station personnel, it is a 250-watt remote control job, crystal controlled. It uses a 6A6 oscillator and doubler, a pair of 802's first buffer stage, and an Eimac 100th final. Modulation is by a pair of Eimac 100th, class B. The receiver is a specially constructed superhet National No. 110.

Squad-car installation contained separate units for two-way communication system, being 15-watt jobs powered by a Pioneer 400-volt 250-mil. dynamotor. The receiver is also a National No. 110.

Most ham transmitters consisted of an RK34 modulated by a 42 and powered by a Pioneer 100-mil. and 300-volt genemotor. The parallel rod type of circuit was used, built to reduce much of the vibration. Some of the cars had ordinary transceivers. None of the ham equipment is in any way subsidized by the Sheriff's office and everything is made up by the members of this network.

While the Sheriff's organizations were going into action and covering these washed and devastated areas, Matt Murray, control chief in charge for the other networks, placed his men. These networks followed in the wake of the Sheriff's department and were now fully organized with amateur radio operators. Within fifteen minutes after Murray had received the order to spot his aides he had two positions covered to act as relays for Van Nuys and North Hollywood, two small communities which were badly in need of succor. These two spots in San Fernando Valley had absolutely no means of communication with Los Angeles.

They were in a sorry plight, when W6LRO and W6OZV in their mobile units managed to reach them. Matt Murray efficiently handled the desk over which more than three thousand messages passed. First starting the five-meter band going, and then realizing the necessity for easy communication with his outlying units, he contacted W6BHP to handle the 160-meter band, and act as relay for him.

The type of work done by the men in the field is illustrated by the Red Cross demanding information as to the people's welfare in the North Hollywood High School. W6OZV who had been stationed

in this territory was immediately contacted but advised that it would be impossible for him to get to the High School quickly, as the rushing waters did not permit his moving the car. He then signed off and proceeded to wade, chest deep, through a swirling onrushing mass of water for almost a mile to the high school. He got there, obtained the information, and then went back into that maelstrom and almost certain drowning. Miraculously, he managed to get to his transmitter where he continued to work headquarters as if nothing had happened.

During this time Murray, who began to worry about his various units risking their lives, cautioned three mobile operators who were converging on the North Hollywood High School, to act as their communicator about the waters, but one of them managed to work his way to the school in spite of the warning.

Tujunga Canyon, which is about 20 miles from Los Angeles, was one of the hardest places hit, and Murray was almost beside himself because he had no men to reach this outlying area. Suddenly, communication was begun with an amateur, who, without anyone directing him to this most dangerous spot, had worked his way into the flooded area and to the mouth of the canyon, giving the information that was required by the various divisions stationed in Los Angeles.

He guided the American Legion men to Tujunga Canyon where they were able to save 110 people. There were a few whom they were forced to leave behind and who almost perished when the Pacoima Dam gave way and the Canyon walls began to fall. They managed to survive, by the aid of the airplanes which advised them via the amateur operator where to reach higher ground.

Incidentally this man remained on watch continuously for two days and a night directing and aiding in the saving of these lives. When questioned as to whether he was exhausted from the terrific strain put upon him, he said, with a wry smile, "I couldn't think of myself, because I didn't have the time."

The radio operators certainly deserve the highest award that could possibly be given to them, not only for their willingness under trying conditions during this disaster, but for their cheerfulness while they worked.

Commendations are pouring in from many noted sources and especially from physicians who appreciated what the amateur operator did for the alleviation of distress. There were almost 100 babies born during this disaster and the timely arrival of doctors on the scene was only accomplished through the aid of radio operators. We suppose that many of them will be named god-fathers. Most of the commendations ran in this manner:

"If it were not for your men who made it possible to communicate with the Desert Health School at Cathedral City, myself and about fifteen frantic mothers who were in my office would have almost gone insane. They join me in thanking God for you all"

March of Time

(Continued from page 21)

to carry the emotional spirit and significance of the dramatic theme. Frequently special music must be written.

During Wednesday's five hours of rehearsal, simple phrases are re-done literally dozens of times—for *The March of Time* aims to provide sight through sound and no explanation must be necessary to identify the Texas cowhand, the Mississippi farmer, the skeptical New Englander. When the director says, "The next voice is a barber in the gay nineties. Handlebar mustache. Reader of the *Police Gazette*. Knows all about everything in town. Bluff, jovial, speaking condescendingly to a child," the actor submerges himself into the part so well that a few spoken words portray the character completely and typically!

Wednesday rehearsal ends with a complete performance. Intentionally, this clocks about 36 minutes—for just as continued rehearsal perfects each line, adding dramatic punch, so does the cutting to fit time remove slow, unnecessary lines, "tighten up" at every point. For instance when the Scottsboro boys were finally released, the entire case was reviewed. First script with many quotations from judicial opinions might have satisfied less meticulous producers. But when the drama went on the air weighty speeches were translated into the engrossing heart-throbbing interest of the prisoners' reactions. Two pages of original script disappeared as a lawyer entered a prisoner's cell saying, "Hello, Olen. I've got good news for you. The United States Supreme Court in Washington has reversed your conviction."

Another five hours of practice on Thursday ends with a dress rehearsal, including the orchestra. At this point the program is down to 32 minutes. It hardly seems possible to eliminate another second, yet 2½ minutes are cut by the time the cast assembles at 6:30 to rehearse final revisions. When the show goes on at 8 p. m., the actors never know whether they are ahead of or behind the carefully-recorded schedule. That knowledge, the directors feel, would take attention from the meaning of the lines—for if eight seconds are required for proper delivery, forced delivery of the line in five seconds could make an entire scene fall flat, might even cause tongue-slip. So precious seconds are added to or subtracted from the musical cues by control room signals. And if the program falls too far behind, an arbitrary cut may be used with instructions hastily circulated among the cast.

The hands of your livingroom clock creep up to 30 seconds before 8:30. With each second they speed away 2,000 seconds of arduous preparation. This is the end of 500 hours of news research by the eight editorial writers, of 40 hours of clerical work, of 60 hours by the 20 orchestra members, of 420 tense hours shared by 30 highly-strung actors.

That this tension has not long since resulted in nerve-shattering is due primarily to the "family spirit" developed among the cast by Co-directors Spier and Fickett.

Says Ted deCorsia, veteran since *The March of Time's* first tryouts (you've

heard him as Mussolini, Hugh Johnson, Hoover and many others): "We are just like a big family here, in everything, that means. We have our arguments, but they're for the good of the program. Sure, we clown a bit during rehearsals. If we didn't, we'd all go nuts under the strain!"

One doesn't need to be psychic to feel the relief that follows an incident like this, occurring in a fight among children during a Little Lord Fauntleroy scene. "Let's have some real action," pleaded the control room at the fifth tryout. And the youngsters pitched in. After the scene: "One of you little darlings said '—' in that fight. I don't like that!" And quick as a flash, repartee from Announcer Westbrook Van Voorhis, "Why, the precocious little b—d!"

Or how much better the sound crew felt when they "paid off" in this manner: It was a Nazi beheading scene, and Director Fickett became more and more impatient as chicken, bologna, liverwurst were sliced in an endless search for realistic sound. After three hours came success with a ripe cantaloupe cut on a loosely-held music rack, the slither of the descending rack combining with the cantaloupe-cutting until the severed half went *plop!* into a box of sawdust. There is no record of what the director said when, during the broadcast, the ostentatiously-exhibited cantaloupe boldly bore his caricature!

There has been much curiosity as to how voices are so accurately duplicated on *The March of Time*. Untrue is the wide-spread tale that the cast spends its spare time in newsreel theaters. A library is maintained, now containing over six hundred 30-second recordings of newsvoices. The actor simply listens to the timbre, inflection and accent, produces a startlingly correct result. If the voice isn't here, it may be found in *Time's* newsreel library, carefully indexed. As a last resort, the photofiles of *Time* or *Life* will produce pictures that suggest the probable quality of the voice. Comparatively simple is the production of the annual review of the 10 best motion pictures, when the actual scenes are projected for the cast—reviewed and rehearsed until mimicry is 100 per cent.

Into the careful production of *The March of Time* creeps no outside influence. Exclusive control is retained by newsmagazine *Time*. Even when various manufacturers have been permitted to sponsor the program, they have never known the show's content until hearing it on the air. Imagine the consternation of President Rand of Remington-Rand upon hearing the program he was paying for, expose his unfortunate error in reading before a Congressional committee the famed "Wirt letter." *March of Time* not only dramatized the testimony of Sponsor James H. Rand, but followed it with dramatization of the ridicule subsequently heaped on the letter and Mr. Rand himself.

Even as you read this, the news of another week is being dramatized for *The March of Time*—the most carefully prepared program in all radio. And once again, on Thursday night, a familiar yet unknown voice will ring out . . . "TIME . . . marches on!"

Ham Slang

(Continued from page 9)

laughter. Of course he could break down and laugh right out loud, and the microphone would register his hilarity. But that wouldn't be good "ham" form.

When he runs out of conversational soap he'll probably wind things up by saying "Well, 73 and SK, old man. K." 73 is the code abbreviation for best wishes. (Many "hams" gild the lily by making it "very best 73s.") SK means "I've finished transmitting for the present." And K is not a bob-tailed form of O. K. as SWLs suppose. It signifies "go ahead, I'm listening for you."

The "diddle-de-bump-de-bump" is a degeneration of the telegraph code signals for SK which is . . . — . —; which, when sent with a key, sounds like that.

But between CQ and K the amateur will use many terms that fall in the class of technical jargon rather than telegraphic shortcuts.

(Continued on the next page)

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Certainly he'll make mention, and usually at considerable length, of his "rig." This is "hamese" for transmitter. It doesn't mean that he's apologizing for his outfit. Whether it's a five-watter thrown together from junkbox parts or a lordly kilowatter with the last word in gadgets, an amateur transmitter is just a "rig." Sometimes the word is also applied to a receiver or even an antenna. But as a rule it means the transmitter alone.

While he's describing his "rig" for the information—or envy—of the chap at the receiving end, the "ham" is pretty sure to mention some of its component parts: for instance, the "rock." Far from being an annoying pebble and least of all a millstone, this is the piece of quartz crystal that keeps his transmitter on its proper frequency.

The "final" is the last or highest power stage of his "rig." It corresponds roughly with the audio output tubes in a receiver.

Don't expect to hear a loud splash if he mentions the "tank." The "tank" is just the main tuning circuit.

And when he speaks of "running a hundred mils" it doesn't follow that he's a big shot in the flour and feed business. "Mil" is the abbreviation for milliamperes, the unit generally used to measure current fed to a vacuum tube.

While the "ham" is describing his equipment he may throw in some comments on his "shack." This is the room where his outfit is located. But don't assume it's a hut in the backyard, cobbled from packing cases. Like home sweet home, an ama-

teur's "shack" may mean anything from a dusty corner of an attic to a spacious room equipped as handsomely as a broadcasting station. It's simply the place where he does his "hamming."

Following his equipment out-of-doors, the amateur will inevitably talk about his "zepp." This is short for a Zeppelin Antenna, and, as its name implies, was developed for use on dirigibles.

But if he talks long enough the "ham" may turn from equipment to personalities. For instance, he may speak of a fellow "ham" as a "lid." This means an amateur operator who isn't so hot.

Or he may throw in an aside to the "OW." These cryptic letters signify an amateur's wife. (He'd better smile when he says them.) Newly-weds or more considerate "hams" speak of the better half as the "XYL," ("X" meaning "ex-" or "former," and "YL" standing for young lady) though even this has a somewhat unflattering implication.

And if the transmission is marred by shrill cries in the background the "ham" is likely to explain that it's the "Junior op," meaning his young offspring regardless of its sex.

However, after such excursions into the personal he generally comes back to technicalities. Particularly if he's operating on the 20 or 10-meter band he's almost certain to remark about the "skip." This has nothing to do with a mine hoist. It means the skip distance effect, the peculiarity of high frequency waves that causes them to leap over nearby points and come down to earth hundreds of miles away.

He may speak of having to "put on the cans." Don't assume he's preparing a meal of tinned food. He's simply donning the headphones.

Or he may mention—and proudly—that he's "WAC." This isn't the abbreviation for another alphabetical agency in Washington. It stands for "worked all continents," a record to warm the heart of any "ham."

If reception conditions are bad you're likely to hear him say, "I missed the handle, old man." In "hamese," "handle" means name: thus, "the handle here is Joe."

Taking any amateur term too literally can be dangerous. For instance, when you hear "This is W7YYYY operating portable in the third district," you probably visualize a transmitter built into a trailer speeding along some highway. On the contrary, "operating portable" simply means that the "ham" has moved to a different location from that called for on his license, and is waiting for the change of address to be made official.

Of all the strange words in the amateur's lexicon there is one you stand a chance of hearing just once or twice in a lifetime. That is "mayday" (from the French *m'aidez*). You might suppose an amateur who kept saying "mayday, mayday, mayday," was either an ardent Red or keen about doing some May-pole dances. Actually, he's calling for help in a serious emergency. For "mayday" is the phone equivalent of the telegraphic SOS.

Along with code symbols and technical lingo the phone amateur uses a variety of what are known as Q calls. These too

have been carried over from radio telegraphy, but with a difference. Each stands for some routine phrase and means the same thing all over the world. Because these Q calls eliminate language barriers and save so much time, no country has been assigned Q as a first call-letter.

There are hundreds of Q calls covering all sorts of situations. So it is natural that the phone amateur should appropriate some of them though he could say the same thing verbally.

An instance is the oft-heard QSO. Literally, this means "in communication with." From that it has come to mean contact, talk, receiving party. Thus, "A most enjoyable QSO," or "You're my third QSO tonight."

Probably next heard most often on the amateur bands is QRM. This means interference between stations. On phone, QRM is easily confused with its brother, QRN. As distinguished from interference between stations, QRN is electrical noise or static, not heterodyning.

QSA, another Q call with keen interest for the ham, measures the effectiveness of transmission. It is usually the first half of a reception report: "QSA 3, R 6." The number after QSA—1 to 5—indicates intelligibility, while the number after R—1 to 9—indicates volume. In these systems, the higher the number, the greater the intelligibility or volume, as the case may be.

However, some phone amateurs are adopting the code practice of giving reception reports on the RST pattern: R for readability, S for signal strength, and T for tone quality followed by numbers 1 to 9 to indicate the strength of the various parts of the pattern.

When he has been told what his QSA-R score is, the phone amateur often likes to have his record confirmed by mail. So he asks for a QSL. This is usually a postcard, giving the date, time, and other information. He keeps these QSLs as evidence of transmission, just as DXers keep "veris" as evidence of reception.

To help the fellow with whom he's having a QSO to send the QSL to the right place, the amateur gives his QRA, in other words, his postoffice address.

If he is being QRMed heavily and has a spare "rock," the "ham" may tell his QSO he will QSY. What he means is that he's going to shift his frequency to another part of the band.

Since it may take him a few minutes to change crystals and retune his "tank," he'll probably say he will QRX. That is approved "hamese" for "wait a minute," or "I'll be off the air temporarily."

But if he finds that a QSY won't avoid the QRM and that any QSO is hopeless, he'll probably QRT. Which means he's calling it a day and "pulling the big switch"—closing down his station.

Though others will be heard now and then, these are the principle Q calls used on the amateur phone bands. They show that "Q as in queer" is scarcely a fair label to pin on this important part of the "ham" language.

And that goes for the rest of the lingo. "Hamese" is a strange tongue to the SWL only because it's not his own patois. It all depends on which language you speak.



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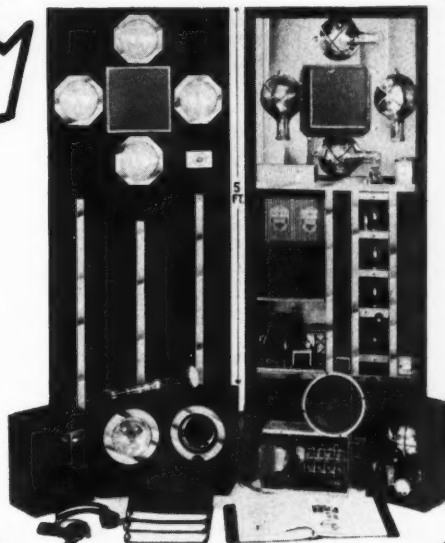
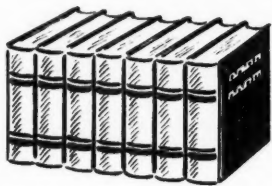


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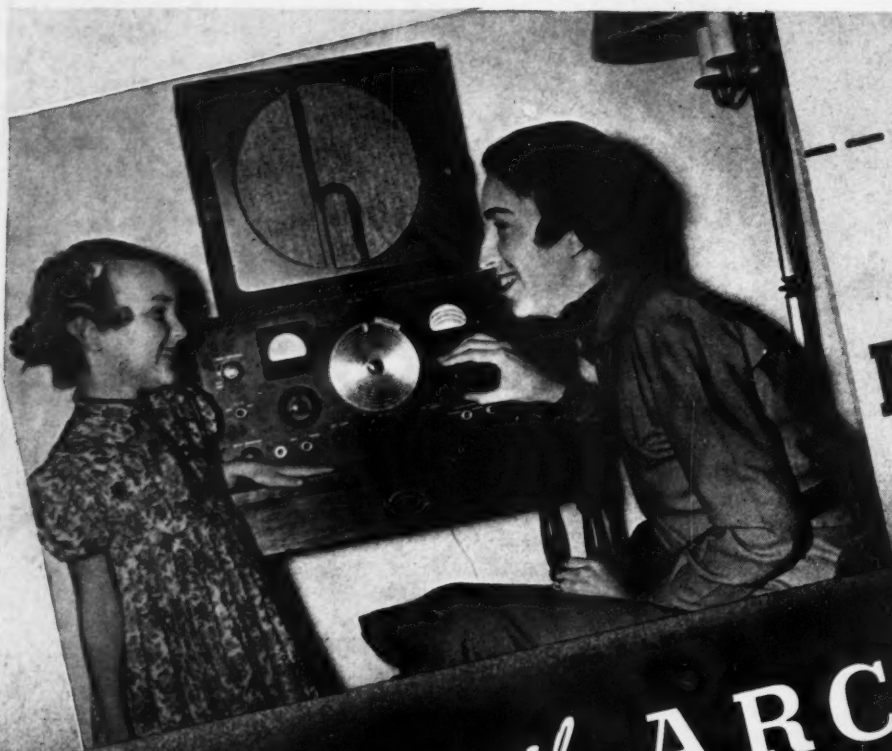
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